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ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ENGINEERING ORDER

TYPE OF PACKAGE	TYPE OF FUNDING (check one)	WORK PERFORMED BY (check one)
☐ REVIEW	■ AUTHORIZATION JOB	☐ MAINTENANCE ☐ OTHER _____
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Conceptual Design Report (144pgs)
Drawings 51376-C001
C002
C003
C004
C005
C006

Put acad dwgs on CV system 9/26/95

REVIEWED FOR CLASSIFICATION
BY KB 174-93
DATE See Attached Letter

Total Text Pages attached 146 # of Drawings attached 12

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ECR #	INITIATOR (Print, Sign)	DATE	EXT / Pager
	R P Campbell / RP Campbell	9/26/95	9616/7005

Additional / Related Job #	EQ COORDINATOR (Print Sign)	DATE	EXT / Pager
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37608	05A			

DES 253/1 1(2) 01/24/95

ADMIN RECORD

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1/159

ROCKY FLATS ENVIRONMENTAL TECHNOLOGY SITE

ENGINEERING ORDER

Continuation Sheet

NOTES

1 This continuation page is to be used to complete the listing of all documents and drawings which accompany an Engineering Order (EO) for review or final distribution It should be attached as page 3 4 etc of the complete transmittal

2 For large transmittals with many drawings append additional sheets to this one as necessary or use a drawing index/drawing title page to list the individual drawings

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989438	37608	Page 2 of 2

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2

INTEROFFICE CORRESPONDENCE

DATE October 27 1993

TO J A. Nesheim Classification Office Bldg 080B X-595

FROM K. Berzen, Environmental Quality Support, Bldg 080 X6753

SUBJECT CLASSIFICATION REVIEW WAIVER FOR ENVIRONMENTAL RESTORATION MANAGEMENT (ERM) DOCUMENTS KB 74 93

This correspondence serves to clarify continuance of the classification review waiver granted in 1992 for ERM documents

Specifically ERM reporting activities with the exception to Operable Unit 5 are determined to be unclassified and UCNI free in nature and content and are considered to be exempt from classification/UCNI review by the Classification Office. To eliminate the need for further updates because of organizational changes this classification waiver pertains to the following information categories: internal as well as external letters work plans reports interim measures RCRA facilities investigations interim remedial actions site evaluations and assessments comparative analyses and other environmental and administrative documentation.

Conference papers journal articles speech texts formal technical reports meeting the intent of DOE Order 1-30.2, Scientific and Technical Information and similar material intended for release to the technical/professional community must continue to receive full clearance through the Classification Office

Concurrence

J A. Nesheim
EG&C Rocky Flats Classification Office

11-10-93
Date

rea

cc:
N M. Hutchins
J A Nesheim
L. L. Tyler
ERM Central Records Center (2)

CONCEPTUAL DESIGN REPORT

WASTE MANAGEMENT FACILITY

for
Rocky Flats Environmental Technology Site
Golden, Colorado

Project 989438

for the

U S Department of Energy
Rocky Flats Field Office
Golden, Colorado

Prepared by

Rocky Mountain Remediation Services
Engineering

Revision 0
September, 1995

Reviewed for Classification

By KB 174-93

Date See Attached Letter

4

CONCEPTUAL DESIGN REPORT REVISIONS

REVISION	DESCRIPTION	ISSUE DATE	PROJ ENGR	USER MGR	P.E. MGR
0	Original Issue	9/26/95	RP Campbell		

THE ABOVE OPERATING CONTRACTOR SIGNATURES INCICATE AGREEMENT THAT THE EQUIPMENT AND/ORFACILITIES DESCRIBED HEREIN FULLY MEET THE USING DEPARTMENT'S REQUIREMENTS

SUMMARY
WASTE MANAGEMENT FACILITY

The Waste Management Facility (WMF) will provide on site recoverable disposal for low level mixed environmental remediation waste at RFETS The WMF will provide a 100 000 cubic yard waste cell and support facilities The waste cell will be used only for environmental remediation wastes also described as past practices wastes generated at RFETS The WMF will be located at the site of future Cell #4 of the New Sanitary Landfill Support facilities include a pre engineered steel building for equipment decontamination personnel showers and office space leachate storage tanks and a storm water evaporation pond The WMF will be implemented through a combined RFETS Interagency Agency (IAG) and RCRA permit modification process as a Corrective Action Management Unit (CAMU) The WMF will be designed and constructed in accordance with RCRA Subtitle C requirement and will meet State of Colorado siting requirements

This Conceptual Design Report addresses the technical objectives cost estimate preliminary safety assessment and value engineering assessment for the project The schedule funding requirements and project risk assessment are provided in the Project Management Plan The alternative studies including life cycle costs NEPA documentation site selection socioeconomic evaluations and public/stakeholder input are provided in the IM/IRA Decision Document An analysis of on site verses off site disposal is provided in the Evaluation of On Site Versus Off Site Remediation Waste Management Options for RFETS report Together these documents provide the conceptual design documentation required by DOE Order 4700 1A A checklist showing the location of the conceptual design documentation is provided in Appendix 1

The estimated project cost is

Cell Support Costs[1]	$3 074 037	
Cell Construction Costs	7,510,219	
Total Cell Costs		10 584 256
Cap Support Costs[1]	2 277 509	
Cap Construction Costs	2,484,243	
Total Cap Costs		4 762 243
Operations and Monitoring Costs		2 381 606
Additional Costs[2]		26,271,895
TOTAL PROJECT COST		**$44,000,000**

[1] Includes design permitting procurement preconstruction procedures and project management

[2] Includes building factor escalation procurement recovery site support site and company G&A and contingency

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4 HAZARD CLASSIFICATION
5 ER MIXED WASTE DISPOSAL STUDY
6 COST ESTIMATE
7 FIGURES
8 DRAWINGS

1 GENERAL DESCRIPTION OF PROJECT

The purpose of the Waste Management Facility (WMF) is to provide on site recoverable disposal for low level mixed and Toxic Substances Control Act (TSCA) waste generated by environmental remediation activities at the Rocky Flats Environmental Technology Site (RFETS) Currently there is limited on site capacity for low level or low level mixed waste generated by environmental restoration activities The WMF will provide a new disposal cell with 100 000 cubic yards (yd^3) of net waste capacity The facility design will accommodate the possible expansion to adjoining areas

The WMF will be one of several cells that will form a waste management complex at RFETS The three phases in the development of this complex are described below

Phase I — New Sanitary Landfill (NSL) A disposal cell and support facility for solid (sanitary) waste and non hazardous D&D material The NSL is currently under construction The cell has a capacity of 200 000 yd^3

Phase II — Waste Management Facility A CAMU designated cell for remediation wastes only including associated D&D material The cell will have a net capacity of 100 000 yd^3

Phase III — Permitted Waste Cell This may be a future RCRA Subtitle C permitted cell for both remediation and process wastes This permitted cell is not part of this project Support facilities for the WMF will be used for the permitted cell to the extent possible

The WMF will be designed to RCRA Subtitle C standards in accordance with the Colorado Hazardous Waste Regulations 6 CCR 1007 3 and the Colorado Hazardous Waste Disposal Facility Siting Regulations 6 CCR 1007 2 Part 2 The Nuclear Regulatory Commission (NRC) radioactive waste disposal requirements of 10 CFR Part 61 will be used for guidance

1 1 LOCATION OF PROJECT

This project is located at the Department of Energy (DOE) RFETS in Jefferson County Colorado The facility will be located at the site of the RFETS New Sanitary Landfill (NSL) The cell will be located at the site originally proposed for Cell #4 of the NSL The location of the NSL is shown on Figure 1 The conceptual layout of the NSL and WMF site is shown on Drawing 51376 C001

1 2 GENERAL DESIGN CONCEPT

This section gives a brief summary of the design concept A more detailed description is provided in Section 6

1 2 1 Waste Cell

The WMF waste cell will have a gross capacity of approximately 115 000 yd^3 to provide a net waste capacity of 100 000 yd^3 including daily cover The cell is expected to be open two to three years prior to closure The cell will have a double composite liner system The cell will have leachate collection and leak detection systems The leachate collection and leak detection systems will have fluid monitoring sensors and allow for the removal of accumulated liquids Grid markers will be located around the perimeter of the cell to document the location of waste for possible future retrieval

1 2 2 Support Facilities

The following support facilities will be required for the WMF

Building 283 A 6 000 sq ft pre engineered steel building for vehicle decontamination radiological survey locker room showers restrooms office/break space and spare parts storage

Waste Staging Area A 1 750 sq ft concrete pad for unloading of containerized waste

Leachate Storage Tanks Three leachate storage tanks with a concrete secondary containment berm and tanker truck loading station

1 2 3 Site Access and Security

A new road will be constructed to connect the WMF to the main access road for the NSL A security fence will be constructed around the WMF to prevent unauthorized access The fence will separate the WMF from the NSL

1 2 4 Utilities

Utilities will be provided at the WMF as follows

Storm Water Management All storm water run off from the facility will be retained on site The WMF will be designed as a zero discharge facility All run off from the site will either be collected in the leachate storage tanks or routed to an evaporation pond

Electrical Power for the facility will be provided with a 13 8 kV line from the NSL A transformer will be installed outside Building 283 Power will be required at Building 283 the leachate storage tanks and the cell sump risers

Telephone A telephone system for Building 283 will be designed to connect with the existing RFETS system

Water Supply Drinking (potable) water will be provided by the use of bottled water Wash and decontamination water will be hauled to the site and stored in Building 283

Wastewater Wastewater from the Building 283 vehicle decontamination will be stored in tanks and transported to a treatment facility at RFETS Personnel wash and shower water will be transported for disposal at the RFETS Sewage Treatment Plant Incinerating type toilets will be used for Building 283

Fire Alarms Fire alarms will be communicated to the main plant via telephone service to Building 283 The public address system (LSDW) warning system will be provided in Building 283

Instrumentation All instrumentation for the leachate collection system leak detection system leachate storage system and equipment decontamination system will alarm in the Building 283 office area

1 2 5 Leachate Transfer and Storage System

A leachate transfer and storage system will be provided to manage leachate that is generated and collected in the waste cell This system will transfer leachate from the waste cell to the three 500 000 gallon leachate storage tanks Leachate will be transferred from the storage tanks to a treatment system at RFETS by tanker truck

1 3 GENERAL DESIGN CRITERIA

The design of the facility will be in accordance with DOE Order 6430 1A General Design Criteria and applicable codes standards and guidelines as listed in Appendix 2 The Title II design including field changes for the NSL will be used for the WMF where applicable

All equipment and facility sizes capacities and ratings etc listed within this Conceptual Design are preliminary and are intended only to relay the general intent and scope of the project Final sizing will be performed during Title II design All equipment will be sized to operate at the RFETS site elevation of 6 000 ft above sea level

The WMF will be designed according to the requirements of the appropriate regulatory agencies and their permit conditions Regulatory requirements include those promulgated by the Colorado Department of Public Health and Environment (CDPHE) 6 CCR 1007 3 Part 264 and 6 CCR 1007 2 Part 2 The NRC requirements of 10 CFR Part 61 do not apply to DOE facilities and will be used as guidelines only The regulatory decision and approval process for the WMF will be conducted as a Corrective Action Management Unit (CAMU) under the Interagency Agreement (IAG) as a modification to the Corrective Action section of the RFETS RCRA permit

1 4 FUNCTIONAL REQUIREMENTS

A copy of the Operational Requirements Document (ORD) for the WMF is provided in Appendix 3 Functional requirements for the design include

100 000 yd^3 net waste capacity for low level mixed waste
Located at Cell #4 of the NSL
Remediation waste only bulk and containerized no free liquids
Bulk wastes will require compaction at cell to specified density
Waste in drums or other containers may require removal from the container compaction of the entire container or infilling with bulk waste between waste containers
Cell operational for two to three years
500 maximum with 250 yd^3 per day average waste placement
Waste prepared for placement prior to shipment to WMF Storage facilities at the WMF not required
Waste must be retrievable
Decontamination and survey of equipment required prior to leaving WMF site
Leachate will be trucked or piped to Building 891 Sitewide Treatment Pant
WMF to operate one shift per day five days per week

A listing of Applicable or Relevant and Appropriate Requirements (ARAR s) is provided in the Interim Measure/Interim Remedial Action (IM/IRA) Decision Document

2 JUSTIFICATION

This project will provide on site capability for remediation wastes generated at RFETS A detailed justification is provided in the Decision Document Without the WMF remedia on wastes will require off site disposal at a cost of approximately $4 000 per yd^3 versus the estimated $500 per yd^3 for the WMF The waste identification and volumes

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from the Decision Document for the WMF are provided in Table 1 Only D&D wastes associated with remediation activities will be place in the WMF

3 RELATIONSHIP TO OTHER PROJECTS

The WMF is related to the following RFETS projects

1 New Sanitary Landfill The NSL is currently under construction and will provide a disposal facility for sanitary waste generated at RFETS The WMF will be located at the site of the proposed future Cell #4 of the NSL The NSL is not designed or permitted to accept either hazardous or low level waste

2 Environmental Restoration Projects The WMF will be used as a management site for current and future remediation wastes at RFETS

4 ALTERNATIVES

An alternative analysis for the WMF was performed as part of the Decision Document Ten alternatives were evaluated including a consideration of life cycle costs and socioeconomic factors The alternative with the highest ranking was a Waste Cell located at the NSL site The Evaluation of On Site Versus Off Site Remediation Waste Management Options study compared the life cycle cost of on site versus off site disposal

TABLE 1
WASTE IDENTIFICATION/VOLUMES FOR WMF

Waste Source (OU/IHSS s)	Description of Media	Waste Type	Estimated Total Volume (yd^3)	Anticipated Volume after Treatment	Waste Availability for CAMU Cell
OU 4 Solar Ponds					
Liners	Asphaltic Material	LLMW	11800	11800	1st Qtr FY 97
Liners Basecourse	Soils	LLMW	11800	11800	1st Qtr FY 97
Sludge	Solidified Sludge	LLMW	6000	10000	3rd Qtr FY 97
Vadose Soil	Soil	LLMW	20000	20000	3rd Qtr FY 97
Debris	Building Materials	LLMW	700	700	3rd Qtr FY 97
Subtotal for OU4			50,300.00	54,300.00	
PEA s (Top IHSS s)					
OU 2 Trench T 1	Drums/Soil Pyrophoric Uranium	LLMW (rads/VOA)	3000	1000	1st Qtr FY 97
OU 2 Trench T 2	Soil	HW (VOA)	300	0	4th Qtr FY 95
OU 2 Trench T 3	Soils Sanitary Sludge possibly drums	LLMW (rads/VOA)	2700	200	3rd Qtr FY 96
OU 2 Trench T-4	Soils Sanitary Sludge	LLMW (rads/VOA)	2700	200	4th Qtr FY 96
OU 2 Trenches T 5 through T 11	Soils Sanitary Sludge asphalt planking	LLMW	6000	1000	FY 97/FY 98
OU 2 Mound Area	Soils Drums	LLMW	5000	1500	3rd Qtr FY 97
OU 2 903 Pad & Lip Area	Soils Asphaltic Material	LLMW	10000	5000	4th Qtr FY 97
OU 9 Tanks 9/10 (Includes OU 8 IHSS 118 1)	Soil tanks piping	LLMW HW	2000	500	2nd Qtr FY 97
OU 9 Tanks 14/16	Soil tanks piping	LLMW HW	4450	3340	4th Qtr FY 97
OU 9 Tank 8	Soil tanks piping	LLMW HW	4500	800	4th Qtr FY 97
OU 10 IHSS 129	Soil	HW	2200	0	3rd Qtr FY 96
OU 9 Tank 40	Soil tanks piping	LLMW	1300	130	FY 97
OU 6 B 1 Dam Hot Spot Removal	Soil	LLW	8	8	3rd Qtr FY 96
Additional Hot Spot Removals	Soil	HW	50	50	4th Qtr FY 96
Subtotal for PEA s			44,208	13,728	
Investigative Derived Material (IDM)	Drill Cuttings/Soil	LLMW HW LLW	1200	180	*See Assumptions
Grand Total			95 708	68 208	78 450[6]

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Assumptions for Table 1

1 OU 4 is completely funded for FY 96 and FY 97 activities Volume estimate ranges from 160 000 yd^3 to 10 700 yd^3 The value chosen assumes the vadose and surficial soils will require minimal remedial action based on risk

2 The waste types exhibited are Low Level Mixed Waste (LLMW) Hazardous Waste (HW) and Low Level Waste (LLW)

3 The majority of IDM waste (85 /) could be dispositioned for disposal now at the Sanitary Landfill if Procedure FO 29A was approved The 1200 yd^3 is approximately 4450 drums

4 Potential Early Actions (PEA s) residuals will be disposed in the cell if soils cannot be returned to the source location

5 This estimate does not include volumes for the remaining IHSS s of the Industrial Area because of the lack of sampling information as a result of budget constraints The OU1/OU3/OU5/OU6/OU7/OU11/ and OU15 activities are not anticipated to generate significant waste volumes

6 The total estimate would be 78 450 yd^3 based on a 15 / fluff/expansion factor

7 Data Resource
The OU 2 data was received on August 1 1995 from A Ledford
The OU 2 data was received from M Burmeister T Kramer and P Laurin
The OU 8/OU 9/OU 10 data was received from M Burmeister and C Cowdery

8 Unique Characteristics of Waste Sources
Trench T 1 of OU 2 potentially contains pyrophoric uranium

9 These Early Actions Removals are presently unknown as to when they will occur based on budget constraints

10 The volumes of the Early Action Removals may not represent a total cleanup scenario based on budget constraints

5 SITING

5 1 SITING CRITERIA

The following regulatory siting criteria apply to the WMF A summary of applicable requirements is included Refer to the listed regulation for the specific requirements

1 6 CCR 1007 3 Part 264 18 Subpart C Installation Standards
Not located within 1000 ft of a fault which has had displacement in Holocene time
New disposal facilities shall not be located in a 100 year floodplain

2 6 CCR 1007 2 Part 2 Section 2 5 3 Hazardous Waste Disposal Siting Requirements
Provide reasonable assurance of isolation away from natural environmental pathways that could expose the public for 1000 years
Immediate area of the site is in strata of minimal ground water flow
Geologic strata surrounding the site combined with engineered barriers shall provide a minimum permeability of 10^{-7} cm/sec of sufficient

thickness between the nearest domestically or agriculturally usable aquifer to isolate any disposed materials
Not impact or be impacted by surface waters
Terrain is such that good drainage exists for precipitation away from site and such that water and wind erosion will be minimal
Geochemical characteristics of the geological strata are compatible with the disposed waste especially in terms of providing high adsorption absorption or chemical fixation of any wastes that may migrate from the immediate area

3 10 CFR Part 61 50 NRC Radioactive Waste Disposal Requirements (Guidance Only)

Avoid areas having known natural resources which if exploited would result in failure to meet performance objectives of these regulations
Not located in 100 year floodplain or wetland
Upstream drainage areas must be minimized to decrease runoff which could erode or inundate disposal unit.
Sufficient depth the water table to prevent ground water intrusion, perennial or otherwise into the waste In no case will waste disposal be permitted in the zone of fluctuation of the water table
Avoid areas where faulting folding or seismic activity occur with such frequency or extent to significantly affect the ability to meet performance objectives or preclude defensible modeling and prediction of long term impacts
Avoid areas where surface geologic process as mass wasting erosion slumping landsliding or weathering occur with such frequency and extent to significantly effect the ability to meet the performance objectives or significantly mask the environmental monitoring program

5 2 SITE SELECTION

Several sites at RFETS were considered for the WMF Table 2 summarizes the initial selection process Cell #4 of the NSL was selected as the preferred site A detailed analysis including numerical ranking of alternatives is included in the Decision Document

TABLE 2
WASTE CELL LOCATION ALTERNATIVES RANKING

	Location Alternatives				
Factors	**NSL Cell #4**	**OU 11 West Spray Field**	**Northeast of NSL**	**OU 4 Solar Ponds**	**NSL Cell #1 Module 2**
Regulatory Complexity	Good	Good	Acceptable	Poor	Poor
Procurement	Good	Acceptable	Acceptable	Acceptable	Good
50 Year Strategy	Acceptable	Good	Poor	Poor	Poor
Perceived DOE/EPA/CDPHE Support	Acceptable	Good	Poor	Acceptable	Poor
Perceived Other Stakeholder's Acceptance	Acceptable	Good	Poor	Acceptable	Poor
Adequate Siting Data	Good	Good	Poor	Good	Acceptable
Cost	Good	Acceptable	Acceptable	Acceptable	Acceptable
Future Risk and Liability	Acceptable	Good	Acceptable	Poor	Poor
Acceptable Waste Streams	Good	Good	Good	Poor	Good
Design	Good	Acceptable	Acceptable	Good	Poor
Schedule	Good	Acceptable	Acceptable	Acceptable	Good
Ability to Support Near Term Risk Reduction	Good	Acceptable	Acceptable	Acceptable	Good
Final Evaluation	Good	Good to Acceptable	Acceptable	Acceptable to Poor	Poor

5 3 SITE DESCRIPTION

A detailed description of the WMF site is contained in the Certificate of Designation (CD) Application for the New Sanitary Landfill February 1992 The WMF site is generally flat to gently sloping to the northeast, with an average gradient of about 2 percent Elevations range from 6 040 to 6 075 feet above sea level

5 3 1 Surface Water Features

Surface water features of RFETS include three intermittent streams several interceptor ditches springs several ponds (including stormwater storage ponds) and scattered wetlands There are no surface water features on the WMF site itself

The primary surface water features near the WMF site which are shown on Figure 1 are

Rock Creek drains the northwest corner of the buffer zone flows northeast to its offsite confluence with Coal Creek Rock Creek flows in the fall winter and spring at approximately 1/4 cubic feet per second (cfs) Flow is intermittent in the summer

Walnut Creek North branch starts south of the WMF site and drains the northern portion of RFETS industrial area The Walnut Creek drainages flow offsite to the east, eventually entering Great Western Reservoir

Upper Church Ditch, McKay Ditch, and McKay Bypass Canal are the closest surface water features to the WMF site and are located at the southern boundary of the site These ditches run periodically in the spring with a flow of approximately 10 cfs

5 3 2 Existing and Planned Land Use

The WMF site is part of the RFETS buffer zone and is located northwest of the developed industrial area It is outside the safety perimeter of the RFETS firing range located to the southeast Future land use for the area is solid waste and proposed low level mixed waste disposal The planned use for the areas adjacent to the WMF site is open space based on the RFETS Final Future Site Use Concept plan

5 3 3 Wetlands and Floodplains

No wetlands are identified on the WMF site based on the U S Army Corps of Engineers RFP Wetlands Mapping and Resource Study December 1994 The closest wetlands are along McKay Ditch and Walnut Creek several hundred feet to the south of the site

The WMF is not within any 100 year floodplains based on the RFP Drainage and Flood Control Master Plan April 1992

5 4 SITE GEOLOGY AND HYDROGEOLOGY

5 4 1 Regional Geology and Hydrogeology

A detailed discussion of the RFETS Geology and Hydrogeology is provided in the 1995 Sitewide Geosciences Characterization consisting of the following

Volume I	Geologic Characterization Report
Volume II	Hydrologic Characterization Report
Volume III	Groundwater Geochemistry Report

Hydrogeologic cross sections in the approximate vicinity of the WMF are shown in Figures 2 and 3 (Figures 2 3 5 and 6 are from Plates in Volume II)

5 4 2 Field Investigations

Field investigations were conducted during the NSL siting study in 1990 Ten test holes (TH 1 through TH 10) were drilled to a minimum depth of 50 feet or until bedrock was encountered whichever was greater The location of these test holes is shown on Figure 4 Test hole logs including soil properties test hole locations and elevations are provided in the NSL CD Two new wells were drilled in 1992 (3092 and 3192) Four additional wells were drilled as part of the geotechnical investigation for the WMF

5 4 3 Site Surficial Geology

A layer of topsoil less than 4 inches in thickness classified in the field as a clayey gravel was observed at the ground surface The Rocky Flats Alluvium was encountered below the top soil layer The Rocky Flats Alluvium consists of a medium to very dense clayey sandy gravel with occasional cobbles The gravels are typically poorly graded Sand and clay lenses were common Thickness of the alluvium ranges between 63 to 93 feet

and generally thins eastward across the site The alluvium 5 to 10 feet above bedrock was typically saturated

5 4 4 Site Bedrock Geology

Claystone bedrock (Arapahoe and Laramie Formations) was found underlying the Rocky Flats Alluvium This bedrock unit is a hard to very hard slightly sandy to sandy claystone unit moist to very moist Depth to bedrock ranges between 63 feet below ground surface at the east boundary of the site to 93 feet below ground surface at the west end

5 4 5 Site Hydrogeology

Water levels in the test holes and monitoring wells were measured after completing drilling and several times thereafter Table 3 presents information regarding historic water level measurements in wells and test holes at the site corrected to reflect the depth to ground water below ground level (bgl)

The general piezometric surface and depth to ground water for the WMF site are shown in Figures 5 and 6 According to Figure 5 ground water at the WMF site flows predominantly in a northeast direction with a relatively uniform hydraulic gradient which ranges from about 0 009 to 0 013 ft/ft Closer to Rock Creek a more northerly component of flow is indicated Most shallow ground water associated with the WMF is expected to eventually discharge to Rock Creek and associated stream alluvial deposits primarily as contact springs and seeps occurring above the creek or as ground water flow through hillslope colluvial deposits The position of these springs and seeps above stream levels indicates that the Rocky Flats alluvium ground water system is not recharged by Rock Creek in the area downgradient of the WMF

The hydraulic conductivity of the Rocky Flats alluvium is known to vary as much as five orders of magnitude Field slug tests conducted in wells at the WMF indicate a range in hydraulic conductivity values from $2\ 6 \times 10^{5}$ (Well 4786) to $1\ 7 \times 10^{3}$ (Well 0190) centimeters per second

TABLE 3
SUMMARY OF NSL GROUND WATER WELLS AND TEST HOLES

RFETS I.D. No.	NSL No.	Depth to Water, ftbgl	Date of Measurements
0390	TH 1W	50 55	7/90 7/95
0290	TH 2W	39 46	6/90 7/95
	TH 3	48	6/90*
	TH-4	44	6/90*
0490	TH 5W	41-46	6/90 6/93
	TH 6	46	6/90*
	TH 7	40	6/90*
1490	TH 8AW	48 56	8/90 7/95
	TH 9	38	6/90*
0190	TH 10W	27-40	6/90 7/95
4786	N/A	52 62	10/86 7/95
3092	N/A	>28	12/92 7/95
3192	N/A	>30	12/92-4/94

*One time measurement

5 4 6 Local Ground Water Usage

The closest well to the WMF is approximately 1 mile hydraulically upgradient (west southwest) of the site The well is a stock well The nearest domestic well is located approximately 1 2 miles to the west or hydraulically cross gradient. In the assumed regional downgradient direction the closest well is approximately 3 miles to the northeast This well is completed in the Fox Hills aquifer The closest downgradient well that appears to be completed in the alluvial (uppermost) aquifer is approximately three miles to the northeast A map with the well locations is shown in the NSL CD

5 5 ECONOMIC GEOLOGY

The WMF site has not been used for excavation or mining Mining in the area of the WMF has not been permitted or proposed based on the Final Future Site Use Concept plan No old mine workings petroleum wells or mineral resources are located in the area of the WMF The closest proposed gravel mining is approximately 1/4 mile to the northwest and southwest Kaiser Hill is verifying that the WMF site is not encumbered with any mineral rights

5 6 GEOLOGIC HAZARDS

The following provides a summary of geologic hazards at the WMF site Additional information on faults landslides and mining activity is provided in Volume 1 of the Sitewide Geosciences study

5 6 1 Faults and Seismicity

The closest faults are the Golden Fault which is approximately 2 miles southwest of RFETS the Walnut Creek Fault, which crosses the southeast corner of the RFETS and the Rock Creek Fault located approximately 1/2 mile north of the RFETS boundary Possible inferred faults trending north northeast through the RFETS industrial area show no evidence of alluvium displacement (Evaluation of the Capability of Inferred Faults in the Vicinity of Building 371 February 1995) The WMF is not located within 1000 feet of any faults that have had displacement in Holocene time which is prohibited by 6 CCR 1007 3 Part 264 18

5 6 2 Erosion

The WMF site is relatively flat and not subject to severe erosion There is no evidence of severe erosion at the site

5 6 3 Landslides and Slumps

Landslides or soil slumps occur on the sides of valleys due to the hydration and lubrication of bedrock clay especially in areas of seepage Fresh landfill scarps are present in the Rock Creek drainage north of the WMF site However alluvial materials in flat lying areas overlying claystone bedrock such as the WMF site are stable No evidence of landslides or slumps is observed or are expected to occur at the WMF site

5.6.4 Subsidence

According to the Jefferson County CAPP maps the WMF site is not in a subsidence hazard area or area of old mine workings Geologic hazards in the immediate area are limited as are hazards that may lead to subsidence conditions

6 DESIGN CONCEPT

6.1 WASTE CELL

The 115 000 yd^3 gross capacity WMF cell is 360 ft by 435 ft at the top and approximately 30 ft deep It is intended that this cell will be one of several future cells that will form a waste management complex Therefore the cell design will need to accommodate the possibility of future expansion into adjacent cells Average placement rates are estimated to be 250 yd^3 per day Maximum placement rates are estimated at 500 yd^3 per day All waste will be prepared for placement and meet the Waste Acceptance Criteria (WAC) prior to transport to the WMF No waste processing will be done at this facility All waste will be placed directly in the cell Only a short term staging area will be provided for unloading of containerized waste Bulk wastes will be compacted after placement in the cell

The cell liner system will consist of two composite liners a leak detection system and a leachate collection system The leachate collection system will consist of a drainage layer drain piping a sump and sump riser The leak detection system will also include a sump and sump riser The leachate collection and leak detection systems will have fluid monitoring sensors connected to a control panel in Building 283

The cell will be placed partly below grade with the top of the liner system approximately 13 ft below the existing grade The lowest point of the liner leak detection system is greater than 15 ft above the maximum measured ground water level The predicted ground water level rise is 7 5 ft for the 1000 year 72 hour storm (9 in) and 16 5 ft for the Probable Maximum Precipitation (PMP) 24 hour event (19 8 in) This assumes the total depth of rainfall instantaneously infiltrates the soil pores immediately above the phreatic surface The relative porosity used for the soil was 10% Contribution of infiltration from upgradient areas would not cause a greater ground water level rise due to the lack of lateral confinement at the site

The following remediation waste streams will be accepted at the WMF

Investigatively Derived Materials (IDM) in drums
Low level mixed waste in boxes drums or containers
Bulk remediation wastes such as soils and sludges
Demolition debris from remediation activities

Waste in drums or containers may require removal from the container or compaction of entire container during placement in order to meet the WAC The WAC is currently under development

6 1 1 Cell Liner

The cell will be designed with a double composite liner and a composite final cover system The liner and cover will comply with RCRA Subtitle C requirements as defined in 6 CCR 1007 3 Part 264 and 6 CCR 1007 2 Part 2

The liner and leachate collection system (Drawing C002) used in the cell will consist of from the bottom upward

A bottom (secondary) composite liner incorporating 3 ft of compacted clay and a geosynthetic clay liner (GCL) overlain by an 80 mil HDPE geomembrane

A geonet leak detection system

A top (primary) composite liner consisting of a GCL overlain by an 80 mil HDPE geomembrane with a protective geotextile

A leachate collection system consisting of 1 ft gravel (bottom) or geonet (side slopes) overlain with geotextile filter fabric

A 1 ft layer of common fill or select waste (initial layer of low level mixed waste of select grading that will not damage liner) to protect the liners and leachate collection system

6 1 2 Grid Block Mapping of Waste

Waste placed in the WMF is intended to be recoverable The cell will be mapped continuously using an alphanumeric system in order to document the location of waste for regulatory documentation requirements and possible future retrieval Grid markers will be located around the perimeter of the cell A controlled survey point will be

installed as a basis for this grid block mapping Cell grids will be established for both the horizontal axes and the vertical (elevation) axes

6 1 3 Runon and Runoff Control

The WMF runon and runoff control system during operation will be designed to control the runoff from the 100 year 24 hour storm event (5 2 inches) Uncontaminated storm water from areas not used for waste management will be routed to an evaporation pond Contaminated water which comes in contact with waste material will be considered leachate and transferred to the leachate collection system Potentially contaminated water from roadways adjacent to the cell (prior to equipment decon) and the Waste Staging Area will be handled as leachate

6 1 4 Clay Liner Test Fill

A clay liner test fill will be constructed and evaluated prior to construction of the cell clay liner The testing requirements and plan of construction will be defined in the Construction Quality Assurance (CQA) plan to be developed during Title II design

6 1 5 Cell Closure

A closure plan will be written during Title II design which will include a conceptual cap design and monitoring requirements At closure the final waste layer will be covered with a 1 ft thick operational cover The top of the operational cover will be sloped to provide adequate surface drainage The operational cover will be left in place for approximately six months to allow monitoring of the waste settlement prior to placement of the final cover After the operational cover and underlying wastes have been allowed to settle the final cover will be constructed over the operational cover

The final cover (Drawing C003) will consist of from the bottom up

A 2 ft layer of compacted clay

A GCL

An 80 mil geomembrane with protective geotextile

A 6 inch drainage/filter layer

A 3 ft cobble biotic/capillary barrier layer

A 1 ft filter layer with geotextile

A 1 ft layer of common fill and 1 ft layer of on site topsoil with vegetation

The top surface of the final cover will be sloped 4% to provide drainage During placement of the final cover the sump riser and leak detection sump risers will be completed The risers will be provided with waterproof seals where they penetrate the cover geomembrane The sump riser covers will be provided with air tight lids and air sampling valves The cover surface will be vegetated to minimize erosion and provide stability

It is assumed a gas venting system is not required due to the type of waste being placed in the cell The WAC will limit the quantity of material with the potential of creating methane gas Gas monitoring will be performed during the operational cover phase to verify a venting system is not required

6 1 6 Leachate Production

Leachate production will be assessed using Version 3 of the Hydrologic Evaluation of Landfill Performance (HELP) computer program The HELP modeling will be performed using RFETS climatological data The HELP modeling will be performed for the initial 100 000 yd^3 cell Alternatives to be evaluated will include empty lined cell lined cell with waste and covered cell

6 1 7 Leachate Collection System

The leachate collection system will minimize the depth of leachate on the primary liner during operation and throughout the post-closure monitoring period by removing liquids The system will keep the buildup of leachate hydrostatic head to less than one foot above the primary liner Slotted collection pipes will carry the leachate to the sump area The pipes will be surrounded by gravel in the cell bottom

Two submersible pumps one for high and one for low flow rates will be installed in the leachate collection riser The pumps will be controlled by a level switch as defined by Rocky Flats Plant Standard SAM 104 The level switch will be adjusted so that at no time will leachate pond more than 12 inches above the bottom of the lined cell The pump motors will be installed with a sensor which will report to the control panel in Building 283 alerting the operator of pump operation or failure

Secondary containment will be provided for all leachate collection piping and ancillary equipment outside the cell in accordance with 6 CCR 1007 3 Part 264 The leachate piping will be equipped with continuous leak detection

6 1 8 Leak Detection System

The leak detection system will allow for detection collection and removal of liquid that leaks through the primary liner The system will consist of a geonet bounded above by the primary liner and below by the secondary liner A solid pipe contained within the low point of the leak detection system will serve as the sump riser for the leak detection system A liquid level sensor will connect the system to a control panel in the office of Building 283 A portable submersible pump for the leak detection sump will be used if leakage is detected Detected liquids will be pumped back into the cell or to the leachate storage tanks The removal system will measure the volume of liquid removed with an in line flow meter The pump will be designed to operate manually

6 1 9 Action Leakage Rate (ALR's)

The ALR will be determined for the liner systems in accordance with 6 CCR 1007 3 Part 264 302 and EPA guidance The rate will be determined for both the cell and the evaporation pond and will be used in the development of a Response Action Plan (RAP)

6 2 LEACHATE TRANSFER, STORAGE AND TREATMENT

6 2 1 Leachate Transfer and Storage

A leachate transfer and storage system will be provided to manage leachate that is generated and collected in the cell This system will transfer leachate from the waste cell to the leachate storage tanks The leachate storage tanks and ancillary equipment will have secondary containment meeting the requirements of 6 CCR 1007 3 Leachate will be transferred from the storage tanks to a treatment system at RFETS by a 5000 gallon tanker truck

Three 500 000 gallon tanks will be used for leachate storage at the WMF (Drawing C004) The leachate collection system must be designed for the 24 hour 100 year storm (5 2 inches) which results in up to 667 000 gallons assuming all precipitation falling on the cell is collected with no retention by the waste The 1 5 million gallon capacity is based on two 100 year storms with the tanks initially empty resulting in 1 3 million gallons of required capacity and the monthly water balance for the wettest year on record (RFETS 1977 1992) assuming treatment of 5000 gal /day resulting in 1 6 million gallons of capacity The capacity will be finalized during Title II design Higher probability

events of longer duration will be considered For example the 72 hour 25 year storm is 5 0 inches

The leachate storage facility will be separate from the NSL system Secondary containment for the storage tanks will comply with 6 CCR 1007 3 with an impermeable coating and able to contain 100 percent of the potential spill volume and precipitation of the 25 year 24 hour storm (4 0 inches) event The tanks will be designed in accordance with 6 CCR 1007 3 Part 264 and Rocky Flats Plant Standard SM 136 Tanks Containing Regulated Substances Heat tracing and insulation will be required for all outside above grade piping and ancillary equipment for freeze protection

All piping materials shall comply with Rocky Flats Plant Standard SP 220 Piping Material Specifications Piping design fabrication and testing shall comply with Rocky Flats Plant Standards SP 136 P&ID Legend & Symbols SP 211 Fabrication of Piping Systems SP 301 'Pipe Systems Testing Procedure and SP-401 General Pipe Insulation

Leachate will require treatment prior to disposal Leachate will be pumped to the WMF storage tanks and transported by tanker truck to a RFETS treatment facility The three tanks will have sampling ports All areas where leachate is transferred will be contained to prevent spills

6 2 2 Leachate Treatment Alternatives

6 2 2 1 WMF Site

An off the shelf treatment unit or trailer could be located at the WMF A precipitation or ion exchange process would be required to remove radionuclides The estimated treatment throughput is 5 10 gpm resulting in the capacity to treat 2500 to 5000 gal/day operating one shift The primary concern is designing a treatment system without adequate characterization of the expected leachate The waste stream will vary over time resulting in changes in the leachate composition

If treatment is performed on site significant influent storage capacity is still required Effluent from the treatment unit could be discharged to the evaporation pond after treatment Increasing the size of the pond would not result in a significant cost increase Sampling would be required after treatment, so effluent storage tanks would also be required

6 2 2 2 Building 891

Building 891(Sitewide Treatment Facility) has the capability of treating the anticipated leachate which could contain organics heavy metals and radioactive contamination The maximum treatment capacity is 30 gpm 5 000 gal/day was used as a design basis based on historical operations and effluent capacity assuming one shift per day Higher rates would be possible with additional shifts Building 891 has a tanker truck unloading station and 30 000 gal of influent capacity The estimated treatment cost is $0 71/gal Operating costs are currently carried by overhead The estimated transportation cost is $0 18/gal based on the estimate for OU7

6 2 2 3 Building 374

It may be possible to treat the leachate in Building 374 However the current Building 374 process has restrictions on the amount of organic contamination that is permitted It is possible that the organic content of the leachate may exceed the Building 374 limits Projects to add organic treatment capability to Building 374 are currently on hold The current treatment capability of Building 374 is 20 gpm The estimated cost is $1 60/gal Transportation cost would be the same as Building 891

The leachate would be trucked to the unloading station at the D231 influent storage tanks which have a capacity of 1 2 million gallons Storage capacity would still be required at the WMF since the trucking capacity would be approximately 10 000 gal/day

6 2 2 4 Modular Storage Tanks

One alternative is to transfer the leachate to the Modular Storage Tanks (MSTs) by a pipeline from the WMF The MSTs have a total capacity of 1 5 million gallons However approximately 1 0 million gal of Interceptor Trench System (ITS) water is being stored in the MSTs awaiting treatment in Bldg 374 The MSTs may not have sufficient capacity to handle the high water flows from both the ITS and WMF during a high precipitation period The treatment would be restricted to Bldg 374 or Bldg 910 with restrictions on the organic content It is assumed both the ITS water and WMF leachate would be RCRA F039 waste

6 2 2 5 Selected Alternative

The selected alternative is to provide storage capacity at the WMF for the estimated leachate generation The leachate will be trucked to Building 891 for treatment with Building 374 as an alternative treatment facility A treatment facility can be installed at the WMF at a later date if determined to be more economical

6 3 EVAPORATION POND

Uncontaminated runoff from areas of the facility not used for waste management will be stored in the evaporation pond and disposed of by evaporation (Drawing C005) The evaporation pond will be designed to store the 100 year 24 hour storm event Design of the pond will be in accordance with established EPA guidelines The pond is anticipated to have a capacity of approximately 2 million gallons

6 4 MONITORING

6 4 1 Ground Water Monitoring

Monitoring wells will be located around the cell to provide long term monitoring of ground water quality upgradient and downgradient of the cell Existing and proposed monitoring wells for the NSL will be used to the extent possible Monitoring wells will be designed and located to meet the requirements of 6 CCR 1007 3 Part 264 Subpart F The Ground Water Detection Monitoring Plan (GWMP) for the WMF will have to take into account the existing and proposed wells for the NSL and the potential impact of the NSL on the site

The Title II design will identify the number location and design of wells for ground water monitoring during operation and the post closure period The monitoring well location and design will be coordinated with the RMRS Environmental Restoration organization The design will meet the requirements of the RFETS Environmental Monitoring Division Standard Operating Procedures Colorado Revised and Amended Rules and Regulations for Water Well Construction and Pump Installation and 6 CCR 1007 3

6 4 2 Surface Water Monitoring

Surface water monitoring will be conducted upstream and downstream of the WMF along Upper Church Ditch Solar powered automatic samplers will be installed at three locations to collect a sample whenever there is flow present in the ditch One sample from each of the three locations will be analyzed quarterly Sampling locations will be upstream of the NSL Cell #1 downstream of the NSL evaporation pond and downstream of the WMF evaporation pond

6 4 3 Air Monitoring

Ambient air monitoring stations will be installed at the WMF site to monitor for radionuclides as required to meet Rocky Flats Health and Safety Requirements and specific requirements of the facility operating air emissions permit

6 5 SITE WORK

6 5 1 Earthwork

The WMF will be designed to preserve and protect existing vegetation and other features on or adjacent to the site that do not unreasonably interfere with construction The project plan will identify staging and stockpiling areas

The grading design will provide existing and new contours at intervals of two feet and spot elevations shown at grade changes and structure elevations Cross sections will be provided where practical and where earthwork quantities are substantial The design will provide for stockpiling of existing topsoil so the material may be reused on disturbed areas The design will also indicate stockpile areas for other excess natural soil (if applicable) for use as daily cover during facility operation

The design will specify appropriate compaction requirements for approved material moisture requirements and general placement methods

6 5.2 Site Access

A new road will be constructed to connect the WMF to the main access road for the NSL Dust abatement and erosion control will be addressed in the Drainage and Erosion Control Plan The design will consider the types of road surfaces necessary to accommodate the construction and operation traffic volume to adequately control any potential dust and erosion problems

Roads will be generally designed to conform to the Colorado Department of Transportation (CDOT) Roadway Design Manual Section 1100 (Off system and low volume roadways) Estimated traffic volume counts will be based on the number of anticipated trips to the WMF over the life of the facility Thickness design for the aggregate gravel course section will be in accordance with the CDOT Roadway Design Manual

6 5 3 Security Fence

A new security fence will be provided surrounding the WMF to prevent unauthorized access The fence will separate the WMF from the New Sanitary Landfill Manually operated access gates will be provided to allow entrance to the WMF as well as an emergency exit from the area The fence will be designed in accordance with Rocky Flats Plant Standard SC 102 Security Fencing

6 5 4 Signage

Signs will be placed around the WMF boundary warning of hazardous and radioactive material Warning signs for a hazardous waste facility will meet the requirements of 6 CCR 1007 3 Signs will also be installed to meet the RFETS Radiological Control Manual (RadCon) for radiological posting and the RFETS Health and Safety Practices Manual (HSP) 10 01 and 12 06 for Occupational Safety requirements Signage for traffic and operations will also be included

6 5 5 Landscaping

Seeding with a proper mixture of grasses or other plant material will be required for disturbed and bare areas to provide erosion control and water conservation in accordance with the Soil Conservation Service requirements Plant material will be selected as proven to be hardy in semi arid climate adaptable to the RFETS area Plants will be only shallow rooted varieties to prevent penetration of cover materials Landscaping shall comply with Section 0290 of DOE 6430 1A Landscape stone may be used as ground cover in areas where live vegetation ground cover is undesirable

6 5 6 Site Drainage

The WMF will be a Zero Discharge Facility A Drainage and Erosion Control Plan and a Reclamation Performance Standard will be prepared during Title II design for construction operation and closure of the facility A site drainage study for each phase of WMF development will be prepared using the appropriate methods presented in the Urban Drainage and Flood Control Manual for determining storm water drainage and as required in the Jefferson County Storm Drainage and Technical Criteria manual Culverts and open ditches will be designed to accommodate the storm water as determined in the drainage calculations Drainage must be designed to not allow flooding of the containment berm from the 100 year 24 hour event The design will be in accordance with Rocky Flats Plant Standard SC 109 Storm Sewer Design Criteria Road culverts will be sized to pass the 100 year 24 hour event with a headwater that will not cause flooding of adjacent structures

Drainage will be directed from undeveloped areas around the north and south side of the facility into existing Rock Creek and Upper Church Ditch No new surface drainage will be added to the Rock Creek drainage Surface drainage within the WMF site but outside the waste cell will be routed to the evaporation pond

Erosion control on steep slopes (3 1) or steeper will be provided with erosion fabric seeded with native grasses native shrubs rock riprap surface gravel surfaces hard surface paving or other approved methods to prevent erosion Erosion control of other areas will be provided by use of silt fences and hay bales per CDOT design criteria

6 6 UTILITIES

6 6 1 Water

A permanent underground water line to the WMF will not be provided A water line was not installed for the NSL due to the estimated cost of $250 000 Water necessary for construction operation and maintenance will be hauled to the construction site from existing plant facilities Tanker trucks are available to transport water to the WMF as water will also be hauled to the NSL Domestic drinking water will be provided by the installation of a water cooler with replaceable 5 gallon bottles Potable water for the Building 283 showers will be trucked to the site and stored in tanks

Water for equipment decontamination will also be stored in tanks at the facility This water will not have to be potable Potential sources of water are from the raw water pond fire hydrants near Building 130 or the fire water tank for the NSL

Emergency eye wash stations will be located as required by RFETS HSP 7 04 The source for eye wash water will be a portable pressure tank system with an emergency wash system

6 6 2 Sewer

There will be no sanitary sewer service to the facility Sanitary service to Building 283 is accommodated through the use of incinerating toilet facilities Wastewater from showering and hand washing will be trucked to the RFETS Sewage Treatment Plant

6 6 3 Propane

Propane supply tanks will be required at the facility to provide propane for space and water heaters in Building 283 The propane system will comply with NFPA 58 Storage and Handling of Liquified Petroleum Gases

6 7 SUPPORT BUILDING 283

Building 283 will be a 7 000 square foot pre engineered steel building The floor plan is shown on Drawing C006 The building includes a two bay equipment decontamination facility and personnel facilities The facility will operate one shift per day five days per week Exterior lighting will be provided at the support facilities for possible nighttime operation Portable lighting will be used for any nighttime work in the cell It is estimated that six people will be working at the WMF

1 Supervisor
3 Waste Technicians
1 Equipment Operator
1 Radiation Control Technician

6 7 1 Structural Requirements

Building 283 is Performance Category 1 in accordance with DOE STD 1021 92 Natural Phenomena Hazards Performance Categorization Criteria for Structures Systems and Components The facility use category is General Use in accordance with RFETS Standard SC 106 The structural design will meet the requirements of the Uniform Building Code (UBC) and DOE STD 1020 94 Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities

The loads used in the structural design of buildings and other structures will comply with of ASCE 7 88 American Society of Civil Engineers Minimum Design Loads for Buildings and Other Structures Dead loads will include the weights of all permanent materials and equipment supported in or on the structure including the structure s own weight built in partitions raceways HVAC duct work and other permanent static loads Live loads will include floor and roof area loads moving vehicles and impact loads

Snow Loads Minimum snow load will be 43 psf at ground level applied in accordance with ASCE 7 88

Wind Loads Wind load design will be in accordance with ASCE 7 88 with a basic wind speed of 109 mph Exposure C will be used for all construction and the importance factor is 1 0

Seismic Loads Structures equipment and tanks will be designed in accordance with RFETS Standard SC 106 as a General Use category

6 7 2 Personnel Facilities

Building 283 will include locker facilities a personnel protective equipment dress out area, shower facilities office/break space and an area for measuring and testing equipment Rest room facilities will be provided based on the anticipated occupancy per UBC Incinerating type toilet facilities will be provided and require no water use Rest room facilities with access for disabled individuals are located in Building 280 Handicapped access to Building 283 will be provided through the rollup doors Holding tanks will be provided for fresh and wastewater Propane heat will be used to provide hot shower water

6 7 3 Equipment Decontamination

6 7 3 1 General

Building 283 will be used to decontaminate equipment that enters the waste cell All equipment will require radiation screening and possible decontamination prior to leaving the WMF site In addition, equipment dedicated to the WMF will periodically require decontamination such as for maintenance The facility will contain a hot water pressure washer The wash water will be collected in a sump filtered and collected in tanks The collected waste water will be transported by tanker truck to Building 891 for treatment The equipment decontamination system will be designed to meet secondary containment requirements specified in 6 CCR 1007 3

Building 283 is located in close proximity to the exit route from the waste cell to minimize potential spread of contamination The decontamination pad will consist of a wash/decontamination area and a separate survey area so one truck can be surveyed while another is being decontaminated The design will be based on RFETS Project 989457 Decon Pad Upgrades

6 7 3 2 Process

The design of the equipment decontamination facility will be based on washing a maximum of ten trucks per day using 100 gallons of water each The wastewater must not exceed 300 mg/l of total suspended solids to meet the influent design basis for the Building 893 pretreatment system that is under construction The equipment decontamination washwater collection and storage system will be designed in accordance with 6 CCR 1007 3 Part 264 Subpart J Secondary containment for the storage tanks will be impermeable and able to contain 100 percent of the potential spill volume The tanks will be designed in accordance with Rocky Flats Plant Standard SM 136 Tanks

Containing Regulated Substances Heat tracing and insulation will be required for all outside tanks piping and ancillary equipment for freeze protection

All piping materials will comply with Rocky Flats Plant Standard SP 220 Piping Material Specifications Piping design fabrication and testing will comply with Rocky Flats Plant Standards SP 136 P&ID Legend & Symbols SP 211 Fabrication of Piping Systems SP 301 Pipe Systems Testing Procedure and SP-401 General Pipe Insulation

6 7 4 Heating and Ventilation

Heating of the equipment decontamination portion of the building will be required to prevent freezing Heating and ventilating equipment will be sized to satisfy the building heating and ventilating load requirements and to meet all general equipment design and selection criteria contained in Rocky Flats Plant Standards the ASHRAE Fundamental Handbook ASHRAE Equipment Handbook ASHRAE Systems Handbook and the ASHRAE Applications Handbook

Ventilation and heating of the personnel areas will be provided as required to satisfy the minimum requirements of Rocky Flats Plant Standards and the latest edition of ASHRAE Standard 62 and in accordance with NFPA 90A Installation of Air Conditioning and Ventilating Systems if the air flow is greater than 2 000 CFM

6 7 5 Electrical and Instrumentation

480Y/277 volt three phase power will be provided at Building 283 for pumps and other equipment Electrical outlets will be provided Lighting will be provided inside and outside the building Low voltage power will be provided for instrumentation

6 7 6 Waste Staging Area

The Waste Staging Area will be provided for truck unloading short term storage of waste prior to placement in the cell or storage of non compliant waste prior to return to the originator The staging area will be a bermed concrete pad The Staging Area will comply with the requirements of 6 CCR 1007 3 Part 264 Subpart I Any liquids collected in the Staging Area will be conveyed to the waste cell and handled as leachate

6 8 SITE ELECTRICAL AND INSTRUMENTATION

6 8 1 General

All Title II drawings will comply with RFR Standard SE 108 Electrical Graphic Symbols Drawings will include identification of each underground service location of manholes splice boxes placement depth plan view dimensioning of services runs and locations panel and MCC configurations panel circuit breakers and panel directories Underground services will be located and their runs identified with below ground warning tape markers All power lines under roadways will be protected from crushing or bending from uneven soil settling or other physical damages attributed to heavy vehicle loading

Exit and emergency lighting systems will be designed in accordance with NFPA Code No 101 Life Safety Code the National Electric Code (NEC) and Rocky Flats Plant Standard SE 301 Emergency Lighting Equipment Emergency lighting will be installed in major trafficways

6 8 2 Power Supply

The design package will provide for a pole line for 13 8 kV overhead feeders from the NSL to the WMF The 13 8 kV line will provide power to a pad mounted 13 8 kV 480Y/277V 3 phase 4 wire transformer The transformer will feed an outdoor distribution center distribution and lighting panels at 480/277 volts 120/208 transformers and panels for receptacles interior and exterior 277 volt lighting motor control centers for motor power and controls and motor surge protection controls

Design practice will conform to the following Practices

1) IEEE Recommended Practices for Energy Conservation and Cost Effective Planning in Industrial Facilities

2) IEEE Recommended Practice for Electric Power Distribution for Industrial Plants

3) IEEE recommended Practice for Grounding of Industrial and Commercial Power Systems

4) IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems

6 8 3 Exterior Electrical

6 8 3 1 Distribution

A new pad mounted transformer will be installed The secondary of this transformer will feed an outdoor 480Y/277 volt 3 phase 4 wire distribution switchboard with an integral main breaker The extension of the 13 8 kV system will be protected in accordance with loading by pole mounted lighting arrestor equipped fused cutouts at the riser pole to the transformer Conductors from the riser pole to the transformer will be 15 kV type MV 90 EPR sunlight resistant pvc jacketed 100% copper tape shielded cable Where required new underground duct banks will be 3 ft below grade and will consist of schedule 80 PVC conduit A minimum of one spare empty conduit in the duct bank will be provided Appropriately sized insulated green or bare copper ground wires will be installed with each conduit used Vinyl marking and warning tape will be provided above the entire length of duct runs

6 8 3 2 Transformer

The pad mounted transformer will be installed outside on a concrete base 6 inches minimum above grade The ratings will be as follows Bottom feed 13 8 kV 3 phase delta primary 480/277 volt 3 phase 4 wire wye secondary 60 Hz radial feed with deadfront construction 55/65 C rise non flammable non PCB containing coolant 95 kV BIL 5 75 percent impedance 2 2 1/2 percent taps above and 2 2 1/2 percent below nominal voltage self cooled compartmental type tamper resistant, weather protected with optional features including dual selector switch gauges liquid level dial thermometer pressure vacuum gauge bushing inserts and lightning arresters

The transformer fluid will be contained around the pad by means of a curb or trench to contain 150% of fluid volume Copper ground rods 3/4 in diameter by 10 ft long will be driven to ground the transformer ground pads

6 8 3 3 Motor Control Center

The main distribution center will be metal enclosed type molded case distribution panel board with a bus rated 3 phase 4 wire 60 Hz, 480/277 volts with incoming metering compartment with selector switches for ammeters and voltmeters

A power monitor device (for monitoring only not control) will be rated for 3 phase operation and will be capable of detecting phase loss low voltage phase reversal and phase unbalance conditions on both Wye or Delta systems The monitor will be rated for 120 volts and the following NOMINAL ratings

Adjustment range	85 125 volts ac
Maximum input	140 volts ac
Frequency	60 Hz
Repeat accuracy	0 1% of setpoint
Dead Band	2%
Transient protection	2500 volts RMS for 10 MS
Trip response	50 MS
Output contacts	SPDT
Contact rating	4 amps @ 120 volts ac
Operating temperature	40 C to +55 C

The monitor will be installed in a metering compartment and will have a failure indicator and an automatic reset The main breaker and branch breakers will be 100 percent rated, with solid state trip adjustable long time and instantaneous pickup settings The main breaker will have adjustable ground fault protection

Applicable standards UL-489 UL 891 NEMA PB1 and AB1

Applicable RFP Standard SX 164 Plant System Component Identification and Labeling

6 8 4 Interior Electrical

6 8 4 1 Distribution

Distribution Panelboards will be 600 volts AC copper bus main breaker protected 3 phase 4 wire 480/277 volt panels for power and general lighting applications complete with door in door construction, ground bus integrated short circuit rating minimum 22 000 amps RMS

Main breakers will be molded case thermal magnetic type up to 400 amps solid state trip over 400 amps zone selective interlocked 1 2 or 3 pole branch breakers sized for the specific application Provide 20 percent spare breaker space

Applicable standards UL 50 UL 67 NEMA AB1 and PB1

Applicable RFP Standard SX 164

6 8 4 2 Panelboards

Lighting panelboards will be 480/277 volts or 120/208 volt 3 phase 4 wire copper bus door in door construction main breaker ground bus integrated equipment short circuit rating 22 000 amps RMS symmetrical bolt on 1 2 or 3 pole breakers sized for the specific application provide 20 percent spare breaker space and ground bus

Applicable standards UL 50 UL 67 and NEMA PB1

6 8 4 3 Illumination

Illumination levels will be determined from applicable tables in the latest edition of the Illuminating Engineering Society (IES) Handbook for interior and exterior lighting General levels of 70 50 20 footcandles (work stations work areas nonwork areas) will be provided along with 100 footcandles in laboratory areas The energy conservation measures recommended in DOE Order 6430 1A and ASHRAE Standard 90 will be incorporated where cost effective

General building interior lighting fixtures will be recessed 2 ft by 4 ft fluorescent, troffers with high quality acrylic lenses ballasts operating at 277 volts Parabolic recessed fluorescent troffers will be applied where high intensity low glare lighting is desirable Fluorescent fixtures will be equipped with high power factor electronic ballasts and matched low wattage lamps for maximum efficiency Special lighting fixtures may be operated at 120 volts

Perimeter building security lighting will be provided at access doors walkways and roads Parking lots will be lit by lighting fixtures attached to aluminum poles mounted on concrete bases Exterior lights will be weatherproof high pressure sodium with high power factor ballasts operating at 277 volts photocell controlled

Emergency light fixtures will not be on local area switches Emergency light fixtures will be equipped with a self charging low maintenance emergency ballast system Exit lights will be provided in all buildings at all exits and exit corridors The exit lights will be supplied with green light emitting diodes (LED) spelling the word EXIT a low maintenance battery and dual voltage charging system All exit sign power will be supplied from un switched power

Applicable RFP Standard SE 301 Emergency Lighting Equipment

6 8 5 Grounding

Buildings will be grounded by a ground loop surrounding the perimeter of the building buried at a depth of 3 ft in clean fill The ground loop will provide less that 25 ohms of resistance to ground and be installed per NEC around the building Size of the conductor will be determined during Title II design The design will provide two ground test wells one at each end of the building

The ground loop will be extended to the main building transformer switchgear panels motors lighting fixtures and each electrical equipment enclosure The grounding will be extended via ground wires installed in all electrical conduits throughout the interior and exterior of the building Conduits will not be relied on for ground continuity

Applicable standards and codes NEC and UL

Applicable RFP Standard SE 103 Electrical Wiring

6 8 6 Lightning Protection

Lightning protection will be provided on the roof of buildings per NFPA 780 and NFPA 70

Applicable standards and codes NEC UL 96 Standard for Safety Lightning Protection Components UL 96A Installation Requirements for Lightning Protection Systems UL-467 Grounding and Bonding Equipment and NFPA 780 Lightning Protection Code

6 8 7 Raceways

See RFP Standards SE 103 Electrical Wiring and SE 112 Building Electrical Raceway Systems for acceptable conduit, wire types and installation methods

6 9 ALARMS AND COMMUNICATIONS

6 9 1 Fire Alarms

Fire protection and detection will conform to DOE Order 5480 7A NFPA 72 and RFETS Standard SF 100 Fire Protection A fire protection analysis will be required to verify that sprinkler protection is not required as Building 283 exceeds 5 000 square feet If a sprinkler system is installed the fire alarm will consist of a fire alarm panel flow switch(s) outside alarm bell(s) and a manual pull station as required by NFPA 101 Life

Safety Code If a sprinkler system is not installed the fire alarm will consist of a fire alarm panel heat detectors and manual pull stations The design of either system will conform to applicable NFPA and RFP standards

6 9 2 Life Safety/Disaster Warning (LS/DW) System

A plant warning system referred to as LS/DW will be installed in Building 283

Head end equipment will consist of an appropriately sized amplifier power supply supervisory system and back up batteries The head end equipment will be packaged as an integrated unit (amplifier power supply supervisory equipment and batteries) supplied by a manufacturer who supplies such units as part of their commonly available products Additionally a switching unit will be supplied to allow the amplifier be switched ON only during an actual announcement Back up batteries will have capacity to supply power for required announcements during the 1 1/2 hour period following a failure of normal power The supervisory system will sound a local alarm An instruction label will be located nearby which directs observers to call a repair number if the system is not operating The supervisory system will also have capability to send a signal to a remote monitoring location

Speaker horns will be installed outside buildings to provide LS/DW notification throughout the WMF See RFP Standard SE-401 Audible Warning Devices for Life Safety/Disaster Warning System for call outs of ceiling speakers horns transformers etc

An acceptance test, similar to the one contained in RFP Standard SE-401 will be performed on the completed system to demonstrate performance of the system A minimum of 75 dBA will be measured on all areas and 10 dB above ambient noise levels in all areas

The inputs to the preamplifier will be routed through a priority logic system which allows only the highest priority signal to reach the preamplifier and subsequently broadcast over the LS/DW The LS/DW system will feed from a dedicated circuit breaker All LS/DW equipment conduit and cables will be labelled per RFP Standard SX 164 In addition wire and cable should be labelled at both ends and in junction/pull boxes to insure ease of trouble shooting RFP Standard SE-401 will be used as a guide for design and placement of the WMF plant warning system Testing of the LS/DW installation will comply with Section 5 of RFP Standard SE-401

6 9 3 Telephone

The design and construction will include a minimum of one functional telephone wall jack in each work area. Access from the existing telephone system will be required Typical service to each telephone set will consist of three four conductor cables Size conduit accordingly

RFP Standard SE 550 Telephone Conduit and Equipment Installation will be used as a guide to telephone installation

6 9 4 Instrumentation

Instrumentation and control requirements for the WMF will consist of new level controls pressure indicators pump controls temperature indicators and controls and leak detection Level controls will consist of high and low level alarms Shutdown interlocks with pump controls to protect equipment and maintain a safe operating system will be provided and shown on the Piping & Instrumentation Drawings (P&ID s) Sump leak detection will consist of gravity feed pipe sloped towards the sump to collect liquids This liquid will be detected by a moisture detection system installed in the sump and will provide an alarm to alert operations personnel of a leak

Controls and instrumentation components will be designed to monitor control and alarm automatically or manually as required and will comply with RFP Standard SAM 103 Instrumentation and Alarms Critical alarms that require immediate action will use an auto dialing system to notify the Shift Superintendent when during off shifts when no personnel are located at Building 283

6 10 ENERGY CONSERVATION

An Energy Conservation Analysis (ECA) is not required since the there are no new buildings larger than 10 000 square feet and total energy consumption is not expected to exceed 500 million BTU per year

6 11 OPERATIONAL EQUIPMENT

Rolling stock and heavy equipment will be required for operation of the WMF It is anticipated that this equipment will be dedicated to this facility An initial list of equipment, some of which may already be available at RFETS is provided below

Compactor (i e sheepsfoot) to compact bulk waste in the cell
Dozer to handle bulk waste and daily cover material
Forklift or Tool Carrier to unload drums and/or boxes of waste
Tanker Truck(s) to transport leachate and waste water from the decontamination facilities to a Rocky Flats treatment facility
Potable Water Tanker Truck to transfer potable water for washing and showering It is anticipated that this service will be subcontracted at the NSL so that procuring a truck would not be necessary

6 12 OPERATIONAL SEQUENCE

Remediation waste will be generated at various locations within RFETS Bulk waste will arrive at the WMF in dump trucks covered with tarps or in roll-off containers on trucks The trucks will enter the facility and drive into the cell to unload the waste The operational equipment will be used to handle and compact the waste inside the cell The transport trucks will exit to Building 283 for decontamination and survey prior to leaving the site Containerized waste will be unloaded at the Waste Staging Area and the transport trucks will not require decontamination The containerized waste will then be transferred to the cell by the operational equipment. Containerized waste will either be emptied from the container in the cell and compacted or the container and contents will be compacted together after placement in the cell Containerized waste should not sit at the Waste Staging Area for more than one shift

6 13 SAFETY CONSIDERATIONS

The design and construction accomplished on this project will conform to DOE Order 5480 4 Radiological controls will be based on the RFETS RadCon Manual It is assumed the cell and equipment decontamination areas will be considered a Contamination Area The National Fire Code and NFPA Code 241 Safeguarding Building Construction and Demolition DOE Order 6420 1A RFETS HSP Manual and CFR 29 (OSHA 1926 and 1910) will apply to work on this project during construction

7 ENVIRONMENTAL REQUIREMENTS & PERMITTING

7 1 DECISION PROCESS

The decision documentation and approval will be conducted in a combined IAG and RCRA Corrective Action Procedures mandated in the IAG and the RCRA Corrective Action process will be combined to the extent practical The IM/IRA Decision Document will be used to initiate the IAG and the RCRA Corrective Action permit modification process

A general two step process is contemplated and consistent with the approach taken under both jurisdictional paths A review of the Highway 36 permit and the CD for the NSL revealed a similar process First waste acceptance (what) siting (where) and design (how) is the threshold information required to trigger the permit or CD process Normally waste acceptance siting and design are approved and authorization to construct is given Operational plans are then developed and approved during construction

Similarly under the CERCLA/IAG process the Decision Document and the IM/IRA implementation documentation such as the Title II design and WAC address waste acceptance siting and design Any remaining operational issues will be presented for approval during construction

7 2 CAMU

The cell will be designated as a CAMU in the modification to the RCRA Corrective action section of the permit The cell will be designed in accordance with the requirements of 6 CCR 1007 3 Part 264 Subpart S Subpart S requires that the CAMU comply with the siting requirements of 6 CCR 1007 2 Part 2 if the remediation wastes remain in place after closure of the CAMU CAMUs are excepted from the unit specific minimum technology requirements (MTRs) of Part 264 including Subpart N for Landfills As an enhancement, the WMF waste cell and support facilities will be designed in accordance with the unit MTRs of Part 264

Some of the applicable unit specific MTRs of Part 264 are summarized below

Subpart H Use and Management of Containers This applies to the Waste Staging Area at the WMF

Sloped and designed to remove liquids from precipitation or containers elevated to prevent contact with liquids (assuming no free liquids in containers)(264 175(c))

Subpart J Tanks This section applies to the Leachate Collection and equipment decontamination wastewater systems at the WMF The tank systems will have

Integrity assessment by independent Professional Engineer (PE) (264 192(a))
Secondary containment for tanks and ancillary equipment (264 193) consisting of double wall tanks/piping or coated concrete containment
Overfill protection and leak detection (264 194)

Subpart K Surface Impoundments This section applies to the Evaporation Pond at the WMF The pond shall have the following

Top geomembrane liner (264 221(c))
Bottom composite liner with geomenbrane and 3 ft of compacted clay
Leachate collection system between the two liners (leak detection system) 12 inches of drainage material or geonet
Leachate collection sumps and pumps
Construction Quality Assurance (CAQ) program directed by PE (264 19)

Subpart N Landfills This section applies to the Waste Cell at the WMF The cell will have the following

Top geomembrane liner (264 301(c))
Bottom composite liner with geomenbrane and 3 ft of compacted clay
Leachate collection system above top liner with 1 ft maximum leachate depth
Leachate collection system between the two liners (leak detection system) 12 inches of drainage material or geonet
Leachate collection sumps and pumps
Construction Quality Assurance (CAQ) program directed by PE (264 19)
Survey benchmarks for cell and records on contents of cell and approximate location of each waste type within cell (264 309)
Containers must be greater than 90% full and crushed shredded or reduced in volume before burial (264 315)

Subpart F Ground Water Protection This section applies to the entire WMF site

7 3 RCRA Part B Permit

The Corrective Action Section of the RCRA permit will be initially modified to designate the CAMU and incorporate the threshold waste acceptance siting and design information and subsequently modified to address operations

7 4 CERTIFICATE OF DESIGNATION

A Certificate of Designation (CD) was approved by Jefferson County for the NSL as required by 6 CCR 1007 2 Part 1 for Solid Waste Disposal Facilities Section 1 3 9 of those regulations require that CDPHE approve significant changes in waste streams design or operations The change in waste stream from non hazardous to hazardous and the change in design configuration represent a significant change for the purpose of those regulations

As an IAG remedial/corrective action that will accept only remediation wastes and is conducted entirely onsite the WMF is not required to obtain either a new CD for the CAMU or to modify the existing CD (paragraph 121 of the IAG) Because CDPHE is reviewing both the IM/IRA Decision Document and the RCRA Corrective Action permit modification the intent of the Section 1 3 9 requirements will be met

7 5 NEPA

National Environmental Policy Act (NEPA) values have been incorporated into the CERCLA format Decision Document The Decision Document includes a NEPA analysis for the WMF that considers socioeconomic impacts in a feasibility study type alternatives analysis This is considered Environmental Impact Statement (EIS) equivalence

7 6 APENS

An Air Pollutant Emissions Notification (APEN) will be required to notify the CDPHE of potential emissions during construction and operation of the WMF

7 7 STORM WATER PERMITS

Any storm water discharges at RFETS are regulated by the EPA under the Clean Water Act (CWA) The CWA requires that a National Pollutant Discharge Elimination System (NPDES) permit be obtained for the construction activities of the WMF In order to obtain a NPDES permit for construction a Notice of Intent (NOI) must be submitted to the EPA This NOI consists of a Storm Water Pollution Prevention Plan (SPPP) which is developed specifically for the construction site The NOI must be submitted to the EPA at least 48 hours prior to the start of construction The SPPP must be signed by DOE Kaiser Hill and the construction subcontractor prior to construction A NPDES permit will not be required for operation as the WMF is a zero discharge facility as there will be no discharge of storm water from industrial areas of the WMF All storm water

runoff during operation will be collected in the leachate storage tanks or the evaporation pond

8 QUALITY ASSURANCE

The System Category Levels for this project based on COEM DES 223 are 3 and 4

Category 3 relied upon for worker protection from radiological or toxicological hazards required for protection of SNM required for site response in an emergency or provide automatic fire suppression or detection capability

Category 4 systems not meeting the criteria for Categories 1 2 or 3
The following systems for the WMF are System Category 3

1 LSDW System for Building 283
2 Leachate collection and storage system and
3 Equipment decontamination wastewater system

All other systems including the waste cell Building 283 and the evaporation pond are System Category 4

9 PRELIMINARY SAFETY ASSESSMENT

A Hazard Classification for the WMF determined that the facility is less than Category 3 and is exempt from the requirements of DOE Order 5480 23 Nuclear Safety Analysis Reports A Safety Analysis Report (SAR) is not required The draft of the Hazard Classification is provided in Appendix 4

10 VALUE ENGINEERING ASSESSMENT

A value engineering type study was performed to determine the best way to design and construct a retrievable mixed waste storage/disposal facility at RFETS The alternative selected was a standard cell with an engineered floor to enhance retrievability The study is provided in Appendix 5 The Value Engineering Report and lessons learned from the design and construction of the NSL were also utilized for the conceptual design of the WMF

11 COST ESTIMATE

A cost estimate for the WMF is provided in Appendix 6 A Title II cost estimate will be prepared by RMRS Cost Estimating

12 PROJECT MANAGEMENT

The schedule work breakdown structure funding requirements and project risk assessment are provided in the Project Management Plan The Title II design will be performed by Merrick Engineers & Architects through a fixed price subcontract Merrick performed the conceptual and detailed design for the NSL The design will proceed directly to Title II without a Title I preliminary design The design will be reviewed by RFETS organizations and MK Environmental Services at 50 and 100 percent After completion of design a procurement package will be prepared for a fixed price construction subcontract

13 PROCUREMENT ACTION

The construction contractor will procure all equipment and materials for the WMF There will be no Government Furnished Equipment (GFE) for the construction Heavy equipment and tanker trucks required for the facility operations will be provided by RMRS Waste Operations and will not be purchased by this project Merrick will develop all procurement drawings and specifications required for construction

14 APPENDICES

1 CHECKLIST FOR CONCEPTUAL DESIGN DOCUMENTATION
2 APPLICABLE DOCUMENTS
3 OPERATIONAL REQUIRMENTS DOCUMENT
4 HAZARD CLASSIFICATION
5 ER MIXED WASTE DISPOSAL STUDY
6 COST ESTIMATE
7 FIGURES
8 DRAWINGS

Number	Title
51376 C001	Site Plan
51376 C002	Cell Liner Details
51376 C003	Closure Plan Details
51376 C004	Leachate Tanks Plan
51376 C005	Evaporation Pond Liner Details
51376 C006	Building 283 Floor Plans

APPENDIX 1

CHECKLIST FOR CONCEPTUAL DESIGN REPORT (CDR) COMPLETENESS

CDR PARAMETERS	DOCUMENT	COMMENTS
Conceptual Design Documentation		
Alternative Evaluation	IM/IRA Decision Document	A detailed study has evaluated different alternatives from Onsite verses Offsite to different locations Onsite and different technologies Life cycle costs were performed on each alternative
Specific Risk Assessment	PMP	Project Specific Risk for schedule concerns are addressed under the PMP Risk from a human health and environmental aspect are addressed in the Decision Document
Preliminary Safety Assessment	CDR	A Preliminary Hazard Categorization has been conducted which defined the WMF as a NonNuclear Facility The H&S plan along with the DD will fundamentally define the Safety Analysis Requirements
Permitting/ NEPA values	CDR & IM/IRA DD	The CDR and the DD address permitting issues However the NEPA values and ARAR s are addressed in detail under the DD
Socioeconomic evaluations	IM/IRA DD	The DD addresses this issue
Funding requirements & Life cycle costs	WP & IM/IRA DD	The work package addresses outyear funding requirements Life cycle costs were addressed in the DD for alternatives analysis
Value Engineering	CDR	A VE study was conducted on the retrievability option of WMF The key personnel were in attendance with results documented Additionally is the comparison of alternatives conducted under the DD

Public/Stakeholder Involvement	IM/IRA DD	The DD will become the document for public review and comment The DD addresses highlights of previous community participation Ongoing public meeting are held routinely with CAB
Technical objectives	CDR	The CDR identifies the technical specific parameters and requirements All major project milestones deliverables and agreements are addressed under the PMP
Cost Estimates	CDR	The CDR identifies a conceptual design cost estimate Life cycle cost estimates for comparative analysis are in the DD
Schedule	PMP	The PMP addresses the schedule with a WBS of three levels and a logic flow diagram All major project milestones deliverables and agreements are addressed The schedule is resource loaded for activities in FY 96 under the approved Work Package
Site Selection	IM/IRA DD	The DD identifies the different alternatives for site selection and took into account future site use NEPA concerns Endangered Species Act etc

APPENDIX 2

APPLICABLE CODES, STANDARDS AND GUIDELINES

The most current revision or controlled copies of the following codes standards and guidelines apply to the design of this project

General

1 DOE Order 6430 1A United States Department of Energy General Design Criteria.

2 DOE Order 5820 2A Radioactive Waste Management Chapter III Management of Low Level Waste

3 RFETS Conduct of Engineering Manuals Volumes 1 2 3 4 and 5

4 RFETS Configuration Change Control Program Manual

5 Rocky Flats Plant Standards Volumes I II III IV V and VI

6 RFETS Health and Safety Practices Manual

7 Manual on Foundation Investigations American Association of State Highway and Transportation Officials

8 RFETS Radiological Control Manual

9 Subsurface Investigation for Design and Construction of Foundations of Buildings American Society of Civil Engineers

10 Uniform Building Code Latest Edition published by the International Conference of Building Officials (ICBO)

11 Minimum Design Loads for Buildings and other Structures ASCE 7 88 by American Society of Civil Engineers

12 Department of Energy (DOE) Environmental Protection Safety and Health Protection Standards DOE Order 5480 4

13 RFP Standard FO 5 Handling of Purge and Development Water

14 RFP Standard FO 7 Handling of Decontamination Water and Wash Water

15 RFP Standard FO 8 Handling of Drilling Fluids and Cuttings

16 RFP Standard FO 13 Containerizing Preserving Handling and Shipping of Soil and Water Samples

17 RFP Standard GW 1 Water Level Measurements in Wells and Piezometers

18 RFP Standard GW 2 Well Development

19 RFP Standard GW 5 Field Measurement of Groundwater Field Parameters

20 RFP Standard GW 6 Groundwater Sampling

21 RFP Standard GT 1 Logging Alluvial and Bedrock Material

22 RFP Standard GT 2 Drilling and Sampling Using Hollow Stem Auger Techniques

23 RFP Standard GT 6 Monitoring Wells and Piezometer Installation

Civil

1 American Society of Civil Engineers Manual No 37 Design and Construction of Sanitary and Storm Sewers

2 American Water Works Association Standards

3 American Association of State Highway and Transportation Officials Geometrics Design and Highway Standards

4 Colorado State Highway Department Standard Specifications for Road and Bridge Construction

5 Jefferson County Storm Drainage Design and Technical Criteria

6 Colorado Department of Public Health and Environment Colorado Hazardous Waste Regulations Code of Colorado Regulations 6 CCR 1007 3

7 Colorado Department of Public Health and Environment Siting of Hazardous Waste Disposal Facilities Code of Colorado Regulations 6 CCR 1007 2 Part 2

8 Colorado Division of Water Resources Revised and Amended Rules and Regulations for Water Well Construction and Pump Installation 1988

9 American Association of State Highway and Transportation Officials Policy on Design of Urban Highway and Arterial Streets

10 Asphalt Institute Asphalt Paving Manual Thickness Design Manual Soils Manual for Design of Asphalt Pavement Structures

11 Rocky Flats Plant Standard SC 0102 Security Fencing

12 Rocky Flats Plant Standard SC 0109 Storm Sewer Design Criteria

13 Rocky Flats Plant Standard SF 0100 Fire Protection

Environmental (see also #6 7 8 under Civil)

1 Colorado Department of Health Air Pollution Control Division Colorado Air Pollution Control Regulations Code of Colorado Regulations Title 5 Chapter 1001 Regulations #1 2 3 8)

2 Colorado Department of Health Air Pollution Control Division Colorado Ambient Air Quality Standards and New Source Performance Standards (Colorado Code of Regulations Volume 5 Parts 14 8)

3 Colorado Department of Health Water Quality Control Division Colorado Water Quality Control Regulations and Discharge Permit System Regulations (Code of Colorado Regulations Title 5 Chapter 1002 Articles 2 3 6)

4 Colorado Dept of Health Water Quality Control Division Colorado Water Quality Standards Groundwater Standards (Code of Colorado Regulations Title 5 Chapter 1002 Article 8)

5 U S Environmental Protection Agency/Colorado Department of Health Water Quality Control Division Stormwater Discharge Regulations (40 CFR 122 26)

6 U S Department of Energy National Environmental Policy Act Compliance National Environmental Policy Act 40 CFR Parts 1500 1508 (CEQ regulations to implement NEPA) DOE 5440 1C 10 CFR 1021 (incorporates requirements for compliance with Endangered Species Act Fish and Wildlife Coordination Act National Historic Preservation Act)

7 Nuclear Regulatory Commission Code of Federal Regulations Licensing Requirements for Land Disposal of Radioactive Waste 10 CFR 61

Architectural

1 NFPA 101 Life Safety Code and NFPA Life Safety Code Handbook

2 Rocky Flats Plant Standard No SC 0100 Hollow Metal Doors and Frame

3 Rocky Flats Plant Standard No SC 0101 Builders Hardware

4 Rocky Flats Plant Standard No SC 0104 Standard for Glass and Glazing

Structural

1 AISI Specification for the Design of Cold Formed Steel Structural Members

2 AISC Steel Construction Manual American Institute of Steel Construction

3 ASCE 7 88 Minimum Design Loads for Buildings and Other Structures

4 AWS D1 1 Structural Welding Code Steel American Welding Society

5 Rocky Flats Plant Standard No SC 0106 Equipment Seismic Qualification

6 SEAC 1984 Structural Survey of Colorado Building Department and 1971 Snow Load Design Data for Colorado (1984 Reprint) Structural Engineers Association of Colorado December 1984

7 DOE STD 1021 92 Natural Phenomena Hazards Performance Categorization Criteria for Structures Systems and Components

8 DOE STD 1020 94 Natural Phenomena Hazards Design and Evaluation Criteria for Department of Energy Facilities

9 ACI 318 Building Code Requirements for Reinforced Concrete American Concrete Institute

Mechanical/Process

1 Backflow Preventor Standards ENG ST 73 1/10/79 ENG ST 72 12/12/78 and ENG ST 75 12/20/78

2 Uniform Plumbing Code published by the International Association of Plumbing and Mechanical Officials (IAPMO)

3 Uniform Mechanical Code published by the International Association of Plumbing and Mechanical Officials (IAPMO) and the International Conference of Building Officials (ICBO)

4 Energy Conservation in New Buildings ASHRAE Standard 90 administered by the American Society of Heating Refrigerating and Air Conditioning Engineers Inc

5 Ventilation for Acceptable Indoor Air Quality ASHRAE Standard 62 administered by the American Society of Heating Refrigerating and Air Conditioning Engineers Inc

6 Rocky Flats Plant Standard SMU 0100 Safety Showers

7 Rocky Flats Plant Standard SMU 0101 Safety Eye/Face Washes

8 Rocky Flats Plant Standard SMU 0302 Ventilation Design

9 Rocky Flats Plant Standard SMU 0303 Heating Ventilation and Air Conditioning Standard

10 Rocky Flats Plant Standard SMU 0304 Standard for Fans

11 Climate Data for Air Conditioning Design Rocky Mountain Chapter Region

12 Rocky Flats Plant Standard SX 0128 Cleaning and Cleanliness Control

13 Rocky Flats Plant Standard SM 0136 Tanks Containing Regulated Substances

14 Rocky Flats Plant Standard SP 0136 P&ID Legends and Symbols

15 Rocky Flats Plant Standard SP 0211 Fabrication of Piping Systems

16 Rocky Flats Plant Standard SP 0220 Piping Materials Specifications

17 Rocky Flats Plant Standard SP 0301 Pipe Systems Testing Procedure

18 Rocky Flats Plant Standard SP 0401 General Pipe Insulation

Electrical

1 MIL HDBK 1004/4 Electric Utilization Systems

2 NFPA 78 Lightning Protection Code

3 NFPA 70 National Electric Code (NEC)

4 NFPA 75 Protection of Electronic Computers/Data Processing

5 NFPA 101 Life Safety Code

6 NFPA 110 Emergency and Standby Power Systems

7 ANSI/IEEE 141 IEEE Recommended Practice for Electric Power Distribution for Industrial Plants

8 ANSI/IEEE 142 IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems

9 ANSI/IEEE 241 IEEE Recommended Practice for Electric Power Systems in Commercial Buildings

10 ANSI/IEEE 242 IEEE Recommended Practice for Grounding of Industrial and Commercial Power Systems

11 ANSI/IEEE 446 IEEE Recommended Practice for Emergency and Standby Power Systems for Industrial and Commercial Applications

12 ANSI/IEEE 493 IEEE Recommended Practice for Design of Reliable Industrial and Commercial Power Systems

13 ASHRAE 90A Energy Conservation in New Building Design

14 Rocky Flats Plant Standard SAM 0103 Instrumentation & Alarms

15 Rocky Flats Plant Standard SAM 0104 Level Sensors

16 Rocky Flats Plant Standard SC 0107 Sealing Building Penetrations & Electrical Conduit

17 Rocky Flats Plant Standard SE 0103 Standard for Electrical Wiring

18 Rocky Flats Plant Standard SE 0105 Motor Control 3 Wire P/B Standards

19 Rocky Flats Plant Standard SE 0107 Quality Control of Molded Case Breakers

20 Rocky Flats Plant Standard SE 0112 Building Electrical Raceway Systems

21 Rocky Flats Plant Standard SE 0205 Emergency Exit Signs

22 Rocky Flats Plant Standard SE 0301 Emergency Lighting Equipment

23 Rocky Flats Plant Standard SE 0401 Audible Warning Devices for Life Safety/Disaster Warning System

24 Rocky Flats Plant Standard SE 0550 Telephone Conduit and Equipment Installation

25 Rocky Flats Plant Standard SE 0701 Alarm System Cables

26 Rocky Flats Plant Standard SE 0901 Security Alarm Single Personnel Door

27 Rocky Flats Plant Standard SF 0100 Fire Protection Standard

28 Rocky Flats Plant Standard SX 0164 Plant System and Component Identification System and Labelling

29 UL 96 Lightning Protection Components

30 UL 96A Lightning Protection Installation Practices

60

KAISER HILL
COMPANY

DRAFT

INTEROFFICE MEMORANDUM

DATE September 26 1995

TO D E Steffen Projects Group Bldg 080 X8655

FROM D R Swanson Safety Analysis Bldg T886B X7009

SUBJECT HAZARD CLASSIFICATION FOR THE WASTE MANAGEMENT FACILITY
DRS-071-95

Ref D E Steffen ltr DES-005-95 Hazard Classification for the Waste Management Facility

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PURPOSE
This memo documents the Hazard Classification for the Waste Management Facility and defines the safety analysis documentation requirements to comply with this classification

DISCUSSION
Using proposed new DOE Standard DOE-EM-STD-30XX-9X *EM Facility Hazard Categorization Standard* and DOE-STD-1027-92 the facility has been categorized as less than Category 3 because it contains less than the threshold levels of Pu The facility is thus exempt from the requirements of DOE Order 5480 23 and may be managed as a Radiological Facility Documentation requirements are defined in DOE Standard EM-5002 and include the need for an Auditable Safety Analysis and a Health and Safety Plan The details of an analysis are provided in Attachment 1

RESPONSE REQUIREMENT
No response is required If you have any questions please contact me

DSL pjs

Attachment
As Stated

cc
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HAZARD CATEGORIZATION ANALYSIS

~~MAR CALCULATION~~ FOR WASTE MANAGEMENT FACILITY

ASSUMPTIONS

To be conservative MAR was calculated using total Pu contents found in the following sources

- OU4 Proposed IM/IRA-EA Decision Document
- Phase 2 RFI/RI Report 903 Pad and Mound and East Trenches Area Operable Unit 2 Dec 93
- Direct results from sampling and analysis data from RFEDS from the Phase I RI/RFI Work Plan for OU9

For OU4 data total Pu estimates were available For OU2 data the highest Pu mean concentration was used For OU9 data the maximum measured Pu concentration was used For those areas from which documentation was not readily available (OU6 additional hot spots drill cuttings) the highest concentration from OU2 and OU9 was used IM/IRA documentation indicates that this is probably extremely conservative

MAR CALCULATION

For OU4 total Pu is the sum of Pu in Liners Sludges Soils (Liners Basecourse) Vadose Soil and Debris Debris measurements are not given in the data so the average concentration for given data is used

Liners	0 020 g Pu	11800 yd^3
Sludges	0 038 g Pu	10000 yd^3
Soils	0 139 g Pu	11800 yd^3
Vadose	0.245 g Pu	20000 yd^3
Subtotal	0 422 g Pu	53600 yd^3

Debris (g Pu) = 0 422 g / 53600 yd^3 x 700 yd^3 = 0 0057 g Pu

$Total_{OU4\ Pu}$ = 0 442 + 0057 = 0.448 g Pu in 54,300 yd^3

For OU2 total Pu is the maximum concentration in the OU2 data times 29 080 yd^3

$Total_{OU2\ Pu}$ = (31 41 x 10^{12} Ci/g / 0 076 Ci/g) x 7 65 x 10^5 g/yd^3 x 29080 yd^3
= 9.19 g Pu in 29080 yd^3

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For OU9 total Pu is the maximum concentration in the OU9 data times 9450 yd^3

$$Total_{OU9\ Pu} = (16\ 09 \times 10^{12}\ Ci/g\ /\ 0\ 076\ Ci/g) \times 7\ 65 \times 10^5\ g/yd^3 \times 9450\ yd^3$$
$$= \underline{1.53\ g\ Pu\ in\ 9450\ yd^3}$$

For other OUs total Pu is the maximum concentration for OU2 and OU9 (31 41 pCi/g) times 368 yd^3

$$Total_{Other\ P} = (31\ 41 \times 10\text{-}12\ Ci/g\ /\ 0\ 076\ Ci/g) \times 7\ 65 \times 10^5\ g/yd^3 \times 368\ yd^3$$
$$= \underline{0.12\ g\ Pu\ in\ 368\ yd^3}$$

Material at Risk (MAR) is calculated by adding the totals for all Pu calculations Per new STD-30XX segmentation could be applied to this system and the MAR would be reduced In this case the much more conservative approach of using total Pu in the Waste Management Facility will be applied for simplicity

$$MAR = Total_{OU4\ Pu} + Total_{OU2\ P} + Total_{OU9\ Pu} + Total_{Other\ Pu}$$
$$= 0\ 448 + 9\ 19 + 1\ 53 + 0\ 12$$
$$\underline{MAR = 11.3\ g\ Pu}$$

ANALYSIS - DETERMINATION OF HAZARD CATEGORIZATION

Using the proposed STD-30XX the Hazard Category is determined using the following formula MAR x R_{HC} where MAR is calculated in the attachment to this memo and R_{HC} is taken from the standard as ARF_{HC} / ARF (ARF is the Airborne Release Fraction) or 5 x 10^6 / 1 x 10^3 Thus the product is

$$MAR \times R_{HC} = 11\ 3\ g \times (5 \times 10^6\ /\ 1 \times 10^3) = 0\ 057\ g\ Pu$$

This number is less than the 8 4 g threshold of category 3 and so the facility would be managed as a Radiological Facility

~ SED-3027 for

M E M O R A N D U M

DATE July 5 1995

TO Dorthea Holt

FROM Doug Steffen

RE Operational Requirements Information

CC Tim O Rourke Don Mittlestadt, Chris Dayton K H), Russ Boyd (K H)

I have used the outline of the Operational Requirements Document to provide the information in this memo Types of information requested by the Document, which are not required for the low-level mixed waste disposal facility (LLMWDF) are annotated as "not applicable

1 Facility Requirements

1 1 New Facility

The purpose of the LLMWDF is to provide recoverable disposal for low level mixed waste generated by remediation activities at the Rocky Flats Environmental Technology Site (RFETS) The LLMWDF will be located at the area currently designated as Cell 4 of the new sanitary landfill The facility should be sized to accept 50 000 cubic yards (cyd) of waste The design should accommodate the possibility that the facility may need to be expanded to a capacity of 100 000 cyd

1.2 Modifications to an Existing Facility

Not applicable

2 Utility Requirements

Utility requirements include access roads for waste delivery vehicles and environmental monitoring personnel Electricity will be required for the onsite operations office

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3 Process Requirements

3.1 Process Description

Waste will be prepared for placement prior to transport to the facility It will be transported and directly placed in the facility as much as practical Provisions should be made in the immediate vicinity of the cell for an area to accommodate currently undefined waste processing equipment.

3.2 Capacity Requirements

The cell should be sized to accommodate a minimum of 50 000 placed cubic yards Facilities (haul roads etc) should be designed to accommodate placement of up to 500 cubic yards per day of waste An average placement rate of 250 cubic yards per day should be assumed Assume that waste will be transported in vehicles that can safely operate on existing RFETS roadways.

3 3 Storage and Handling Requirements

Assume that material will be transported and directly placed in the cell Storage facilities will not be required Equipment will be needed to offload containerized material Bulk material will require compaction

4 Operating Requirements

4 1 Operating Assumptions

The facility will operate one shift per day five days per week. Any maintenance will be done during the second shift; also on a five-day-per-week schedule

4.2 Operating Provisions

Not applicable

5 Design Requirements

5 1 Equipment and Controls

Equipment will be required to survey or locate the positions of the placed material for future retrieval Equipment will also be required to handle containers and to compact bulk material

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5 2 Testing Provisions

Testing may be required for the placement and compaction of the bottom clay liner It would preferable to use the test fill for the sanitary landfill

5 3 Maintenance Provisions

Repair or preventive maintenance may be required on the equipment operating within the cell Such maintenance should be performed during the second shift.

6 Interrelationships With Other Processes Facilities, and Support Services

6 1 Interrelationships With Other Processes

Environmental restoration activities will supply waste to the facility The waste will be properly packaged and transportation provided by the generator

6 2 Interrelations With Other Facilities

Leachate from the cell leachate collection system will piped or trucked to the Sitewide Water Treatment Plant.

6 3 Interrelationship With Support Services

Information provided to various questions above

7 Radioactive, Hazardous and Mixed Materials (Non-Waste)

Not Applicable

8 Waste Management

8 1 Radioactive Waste

See 8 3 below

8 2 Hazardous Waste

See 8 3 below

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8 3 Mixed Waste

The facility will be designed to receive low-level mixed waste The waste will be processed as necessary to meet structural requirements for placement in the cell No free liquids will exist except that materials that are solidified using a cementation process may be placed prior to setup

8 4 Regulatory Requirements

The facility will be designed to meet the requirements of the Colorado Hazardous Waste Act and the Resource Conservation and Recovery Act. Environmental documentation for the facility will consist of a CERCLA EE/CA with full NEPA integration A RCRA Part B permit will not be required but the design will meet all the substantive requirements of a permit. A modification to the Jefferson County Certificate of Designation will probably be required as well

9 Health, Safety, and Environment

9 1 Radiation Safety

No shielding will be required Vehicles egressing the cell will probably need to be surveyed and deconned as appropriate

9.2 Nuclear Criticality Safety

Not applicable

9 3 Industrial Hygiene

Not applicable

9 4 Industrial Safety

Operations need to minimize the interaction of foot traffic and heavy equipment.

9 5 Safety Analysis

A safety analysis should not be required for this project. DOE radiation exposures should not exceed those established for Radiation Workers

9 6 Fire Protection

Not applicable

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9 7 Environmental Protection and Pollution Control

The project will be approved under a CERCLA EE/CA. NEPA values will be incorporated into the EE/CA. The facility will be designed with a double leachate collection system Leachate will be contaminated with trace amounts of radionuclides heavy metals and organics

10 Impacts During Project Execution

10 1 Impacts to Operations

Not applicable

10 2 Environmental Considerations

Would recommend that dust control measures be implemented during construction to control nuisance dust

11 Relations to Other Projects

11 1 Other Projects in Construction

This project will be constructed in the footprint of the sanitary landfill complex specifically cell #4 Sanitary cell #1 is currently under construction immediately to the west. We should consider designing the first module without berms and having a common leachate collection system with the second phase module which will consume the remainder of cell #4

11.2 Future Projects

There will probably be other cells developed for LLMW in the footprint of the sanitary landfill However current plans are in a pretty liquid state right now We should just focus on the current module **Note Bill and Dorthea we need to get together ASAP to discuss future modules. Card expects us to be permitting the next phase right now**

12. Quality Assurance Provisions

The design will incorporate existing QA/QC procedures of the RFETS

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13 Safeguards and Security

Not applicable

14 Communications Requirements

Telephone lines will be required for the office trailer for verbal fax and computer

15 Deactivation Decontamination and Decommissioning

Not applicable

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ER MIXED WASTE DISPOSAL

STUDY

DRAFT REPORT
SEPTEMBER 1, 1995

GOAL

Find the best way to design and construct a retrievable mixed waste storage/disposal facility at RFETS

CONCLUSION AND JUSTIFICATION

The alternative selected as the best way to provide for a retrievable mixed waste storage/disposal facility was alternative 2 construct a standard cell with engineered floor Major features of the standard cell include a RCRA double liner lechate collection system and a construction/retrieving ramp

Construction of a standard cell, with engineered floor represents the simpliest most cost effective solution for modifying one cell of the sanitary landfill currently being designed Major advantages of alternative 2 include low cost proven technology and schedule friendly Initial cost estimate of alternative 2 is in the range of $60 80 Million

Alternative 2 offers a simple practical solution for storage and retrieving ER mixed wastes and is readily implementable

DECISION PROCESS

A one day session was held on August 30 1995 to find the best way to design and construct a retrievable mixed waste storage/disposal facility at RFETS A nine member team followed a structured decision analyis process to identify the best solution to the decision being made The steps of the process included

1 Determine the mandatory and desirable objectives to establish a set of criteria for making the decision

2 Brainstorm viable alternatives for achieving stated objectives

3 Evaluate identified alternatives against set of objectives

4 Select best alternative and make final decision

The need for an immediate solution to design and construct a retrievable waste storage/disposal facility limited the brainstorming process for identifying alternatives Even within the set of alternatives identified schedule impacts were the major reason that specific alternatives were not acceptable Many of the identified alternatives met most of the desirable objectives except schedule impacts of being available as soon as possible

PROBLEM STATEMENT

Kaiser Hill has proposed to construct a waste disposal/storage facility at the RFETS This facility is being designed to comply with RCRA requirements for Subtitle C landfills and to meet the Colorado Part 2 siting requirements The facility will be constructed to contain a net 100 000 cubic yards of low level mixed waste (LLMW) While the fundamental concept of this facility is one of a landfill for long term disposal discussions with the public and regulatory agencies strongly indicate that the public is opposed to leaving the waste onsite permanently Public interest groups appear to be very interested in features that enhance the ability to retrieve waste from the facility at a future date

The purposes of this structured planning session are (1) to identify the retrievability alternatives that should be evaluated (2) to evaluate the alternatives for practicality implementability and cost and (3) to select retrievability features that should be incorporated into the design of the facility

DECISION STATEMENT

Find the best way to design and construct a retrievable mixed waste storage/disposal facility at RFETS

IDENTIFIED ALTERNATIVES

The following alternatives were identified as viable options for storing/disposing of ER wastes in one cell of the sanitary landfill at RFETS with the ability of retrieving wastes in the future

1 Construction of a standard cell with RCRA liner lechate collection system and construction ramp

2 Construction of a standard cell described in alternative 1 plus an engineered floor to protect the cell liner

3 Installation of a standard cell plus all wastes containerized

4 Construct a concrete vault

5 Construct a strong vault system

6 Entombment of ER wastes

7 Build new buildings for containerized waste

8 Pretreat ER soils before emplacement into a standard cell

9 Direct offsite treatment and disposal of ER wastes

10 Ex situ vitrification of ER wastes plus cover for closure of site

RECOMMENDATIONS

Sufficient time existed to find the best solution to the decision statement However there would be considerable value to developing an implementation plan for the design and construction of a standard cell plus engineered floor Such a plan would identify specific functions and tasks that would be required and provide an opportunity to perform a cost savings analysis The next steps of a structured analysis would be to describe the process logic for implementing the solution develop an implementation plan and conduct a cost savings analysis of the process

Follow up Issues

Effectiveness	Are we doing the right thing? Do we have credible objectives?
Planning	Do we have a good chance of success? How do we protect our plan? How can we achieve cost savings?

TEAM MEMBERS

Bob Krenzer	Facilitator Tenera
Russ Boyd	K H
Doug Steffen	RMRS/ER
Tom Lindsay	RMRS/ER
Dave Ericson	RMRS/ER
Bob Campbell	RMRS/Eng
Bryan Lewis	RMRS/Cost Estimating
Roland Bannister	RMRS/SWOG
Don Ferrer	RMRS/SWOG
Gil Pankonin	RMRS

DECISION MATRIX

MANDATORY OBJECTIVES	ALT 1 Standard Cell	ALT 2 Standard Cell and Engineered Floor	ALT 3- Std Cell plus Containerized Waste
Ability to retrieve all bulk and containerized material in landfill	Yes	Yes	Yes
No selective retrievability	Yes	Yes	Yes
Protection of public health environment and worker	Yes	Yes	Yes
Closure as soon as possible	Yes	Yes	Yes
Ability to retrieve wastes after closure	Yes	Yes	Yes
Not necessary to containerize waste for retrievability	Yes	Yes	No
No storage of retrieved wastes at cell site	Yes	Yes	Yes
Net 100 000 cubic yards capacity	Yes	Yes	Yes
Meet ARAR s	Yes	Yes	Yes
Ability to retrieve waste during placement closure and post closure	Yes	Yes	Yes
Available ASAP	Yes	Yes	No

DECISION MATRIX

MANDATORY OBJECTIVES	ALT 4 Construct Concrete Vault	ALT 5 Construct Strong Vault System	ALT 6- Entombment of ER Waste
Ability to retrieve all bulk and containerized material in landfill	Yes	Yes	Yes
No selective retrievability	Yes	Yes	Yes
Protection of public health environment and worker	Yes	Yes	Yes
Closure as soon as possible	Yes	Yes	No
Ability to retrieve wastes after closure	Yes	Yes	Yes
Not necessary to containerize waste for retrievability	Yes	Yes	Yes
No storage of retrieved wastes at cell site	Yes	Yes	Yes
Net 100 000 cubic yards capacity	Yes	Yes	Yes
Meet ARARs	Yes	Yes	Yes
Ability to retrieve waste during placement closure and post closure	Yes	Yes	Yes
Available ASAP	No	No	No

DECISION MATRIX

MANDATORY OBJECTIVES	ALT 10- Ex Situ Vitrification plus Cover	ALT 7 9 Determined Not To Be Viable	
Ability to retrieve all bulk and containerized material in landfill	Yes		
No selective retrievability	Yes		
Protection of public health environment and worker	Yes		
Closure as soon as possible	Yes		
Ability to retrieve wastes after closure	Yes		
Not necessary to containerize waste for retrievability	Yes		
No storage of retrieved wastes at cell site	Yes		
Net 100 000 cubic yards capacity	Yes		
Meet ARAR s	Yes		
Ability to retrieve waste during placement closure and post closure	Yes		
Available ASAP	Yes some question		

DECISION MATRIX

DESIRABLE OBJECTIVES	ALT 1 Standard Cell	ALT 2 Standard Cell and Engineered Floor	ALT 4- Construct Concrete Vault
Order of Placement, Type of Waste, Rad Level Haz Component	Medium	Medium	High
Retrieve Waste Without Damage To Liner	Low	High	High
Mapped In Grid System	High	High	High
Simple Cost Effective Design	High ($60 80M)	High ($60 80M)	Medium ($150)
Easy to Retrieve	Medium	Medium	High
Easy Access To Site	High	High	High
Use Same Equipment To Place and Retrieve Wastes	High	High	High
Regulatory Acceptance	Medium	Medium	High
Public Acceptance	Low	Low	Medium
Waste Throughput	High	High	Medium

DECISION MATRIX

DESIRABLE OBJECTIVES	ALT 10- Ex Situ Vitrification plus Cover		
Order of Placement Type of Waste Rad Level, Haz Component	High		
Retrieve Waste Without Damage To Liner	High		
Mapped In, Grid System	High		
Simple, Cost Effective Design	Medium ($100M)		
Easy to Retrieve	High		
Easy Access To Site	High		
Use Same Equipment To Place and Retrieve Wastes	High		
Regulatory Acceptance	High		
Public Acceptance	Medium		
Waste Throughput	Low (Three Years to Process)		

CONCEPTUAL DESIGN SUMMARY COST ESTIMATE

Conceptual Design Report		133 480	
CELL/SUPPORT FACILITIES			
Title II Design	520 187		
Permitting	187 110		
Pocurement	55 547		
Preconstruction	220 929		
Procedures	236 292		
Project Management	1 368 795		
Title III and Project Closeout	351 697		
CELL/SUPPORT FACILITIES SUBTOTAL		2 940 557	
Decon Facility	352 085		
Perimeter Fencing	58 027		
Site Lighting	26 340		
Staging Area	25 639		
Access Road	170 591		
Cell Earthwork	1 875 310		
Cell Liners	1 037 094		
Evaporation Pond	481 075		
Cell General Requirements	270 213		
Leachate System	19 866		
Leachate Tanks	981 613		
Leak Detection	30 653		
Contractor Markups	2 181 713		
TOTAL CELL CONSTRUCTION COSTS		7 510 219	
TOTAL CELL COSTS			**10 584 256**
CAP COSTS			
Title II Design	497 577		
Permitting	128 467		
Pocurement	38 023		
Preconstruction	151 484		
Procedures	162 134		
Project Management	1 058 467		
Title III and Project Closeout	241 357		
CAP SUB TOTAL		2 277 509	
Cap Construction	1 575 689		
Cap Contractor Mark ups	726 997		
Cap General Requirements	182 048		
TOTAL CAP CONSTRUCTION COSTS		2 484 734	
TOTAL CAP COSTS			**4 762 243**
OPERATIONS AND MONITORING			
Operations	1 970 342		
Post Closure Care and Monitoring	411 264		
TOTAL OPERATIONS & MONITORING COSTS			**2 381 606**
TOTAL COSTS PRIOR TO MARK UPS			**17 728 105**

CONCEPTUAL DESIGN SUMMARY COST ESTIMATE

ADDITIONAL COSTS			
Building Factor	361 763		
Escalation	1 833 213		
Procurement Direct Recovery	365 819		
Site Support (38 %)	5 875 752		
Site G&A (13 8 %)	2 944 679		
Company G&A (16%)	3 885 269		
Contingency (37%)	11 005 400		
ADDITIONAL COST SUBTOTAL		26 271 895	
TOTAL PROJECT COST			**44 000 000**

Note Costs may differ slightly to the cost estimate due to rounding errors

Estimate Review

Project LL/MW CERCLA Waste Cell
Project # 989820 02
Project Estimator Bryan L Lewis

Basis of Estimate Design Criteria package dated August 21 1995

Scope of Work Estimate is for a low level / mixed waste disposal cell Project includes a waste cell similar to the new sanitary landfill capable of storing 100 000 cy of waste leachate collection tank evaporation pond and a decontamination/support building The project was broken into two parts the fist has the construction and project support costs and the second has the operations and post closure cost The following is a summary of the total project cost

Construction and Support Costs	$37 800 000
Operations and Post Closure Costs	$ 6,200,000
Total Project Cost	**$44 000 000**

Assumptions

- Production rates and material costs are from Means construction cost data 1995 and Richardson 1995
  Material costs are based on Means construction cost data 1995 Richardson 1995 and Vendors quotes
  The Project Support Operations and Post Cloure hours used in the estimate were submitted by Dave Erickson and are assumed to be correct
  The contingency for the project has been rated based on the level of information provided for the cost estimate
  Schedule provided with the Design Criteria package is correct for the use of escalation
  Labor rates for FY96 were used to produce this estimate
  No de watering will be required during the construction of this project
  No tie downs were used in the construction of the tanks
  Crushed road base will be used for the perimeter roads
  This is considered a rough order of magnitude (ROM) estimate due to the amount of assumptions made in this estimate
  All electrical & utility quantities are assumed since no details were given
  No project specific WBS was provided to produce the estimate
  The estimated costs are expected to change as more detail becomes available
  It is assumed that exterior lights will be installed for operations during the night
  Expansion and compaction factors were used in determining all soil quantities found in this estimate
  These factors came form Construction Methods and Management second edition Table 2 2 typical soil weight and volume changes characteristics
  Since no specifications or manufacturers were specified for the equipment in this project assumptions were made to determine a cost for all of the equipment in this project
  Estimate does not take into account any weather delays to the project which might require overtime to bring it back on track

Estimate Performed By _____
Bryan L Lewis Cost Estimator

Estimate Reviewed and Approved by _____
Linda S Wolfe Cost Estimating Lead

Building Factors

Fixed Price & CPFF Construction

Effective March 6 1995

	Category 1	2	3	4	5	6
	Buffer Zone	Out of Doors Within Plant Facilities 111(1st Floor) 112 122 123 124 125 130 331 334 551 850	Secured Area Out of Doors & Bldgs 111(2nd Floor) 121 441 443 460	Cold Areas Bldgs 371 374 444 447 559 707 764 765 771 774 776 777 779 865 881 883 886 991	Hot Areas Bldgs 444 447 865 886 883 991	Hot Areas Bldgs 371 374 559 707 771 774 776 777 779
Work Factors Constraints						
I Personal	0 00%	4 00%	0 00%	0 00%	4 00%	4 00%
II Fatigue	0 00%	27 00%	0 00%	0 00%	2 00%	2 00%
III Delay	0 00%	0 00%	0 00%	0 00%	0 00%	0 00%
IV Production Efficiency	0 00%	0 00%	0 00%	25 00%	25 00%	25 00%
V Procedural Requirements	9 30%	0 00%	0 00%	0 00%	0 00%	0 00%
Additional Factors						
I Personal Access Control	0 00%	0 00%	0 00%	0 00%	0 60%	0 60%
II Building Access Control	0 00%	0 00%	0 00%	0 00%	1 00%	3 25%
III Building Layout	0 00%	0 00%	0 00%	0 00%	2 10%	2 10%
IV Contamination	0 00%	1 00%	0 00%	0 00%	1 00%	2 00%
V Monitoring	0 00%	2 90%	0 00%	0 00%	3 70%	3 70%
VI Procedural Requirements	6 25%	6 25%	0 00%	0 00%	1 25%	1 25%
VII Shower	0 00%	7 50%	0 00%	0 00%	0 00%	0 00%
VIII Clothing Change	0 00%	12 50%	0 00%	0 00%	0 00%	0 00%
Total Percent Increase Labor Cost	16 1%	70 5%	0 0%	25 0%	43 6%	47 9%
Baseline Building Factor	0 0%	0 0%	0 0%	25 0%	43 6%	47 9%

Building Factors for buildings not listed should be complied by the cost engineer from the individual percents shown above
Good judgment should be used when applying the above factors to ensure that all elements are appropiate for the particular project
Defered Break method utilized

Building Factor Evaluation Category 1 [redacted] Base Line Factors Building Factor 16 13 %

Project Location Landfill Construction & Final Cap Construction

Work Factors 1 0930 x Additional Factors 1 0625 Equals Building Factor

Work Factors Constraints Total 9 30 /

			Possible	Subtotal	Total
I	**Personal**	DOD 5010.15.1 M	[redacted]		0 00 /
	A	Basic(go to rest room get drink of water phone etc)	4		
	B	Slightly disagreeable conditions poor heating	3		
	C	Extremely disagreeable most of the time hot objects ordors & fumes or excessive temperatures and or humidity	6		
II	**Fatigue**	DOD 5010.15.1 M & Rad. Protection Mgt. July/Aug 94	[redacted]		0 00 /
	A	Position Class			
		Working in close cramped positions	1 7		
	B	Mental			
		Routine work committed to habit	[redacted]		
		Full attention copying checking or calculating	2		
		Concentrated attention nonroutine	4		
		Deep concentration inspection work requiring interpretation and discretion of unfamiliar nature	8		
	C	Lighting			
		Normal light at least 75 candle power	[redacted]	0 00 /	
		Looking through drybox windows	1		
		Less than 75 candle for normal work or 125 candle for close work	2		
	D	Noise			
		Normal <60 dec	[redacted]	0 00 %	
		Constant noise such as machine shop > 60 dec	1		
		Average constant noise with loud sharp intermittent noise such as punch press sheetmetal shop etc	2		
	E	Restrictive safety devices			
		1 Safety glasses	0	0 00%	
		2 Protective clothing			
		Whites	[redacted]	0 00%	
		Tyvex	1		
		Anti C s	2		
		Fully encapsulating suits	3		
		Lead apron	3		
		3 Face shield	2		
		4 Heavy tight fireproof coat and shield	1 5		
		5 Filter mask	5		
		6 Respirator			
		Half face	18		
		Full face	25		
		Supplied air	31		
		7 Glove box	1 5		

Q3

III	**Delay**	DOD 5010.15.1 M				0 00%
	A	Isolated job Little coordination with adjacent jobs		1		
	B	Fairly close coordination with adjacent job		2		
	C	Work in close proximity of building operations		1 50		
IV	**Production Efficiency**	Mean s & Richardsons s				0 00 /
	A	Average 10Hour work days 5 days/wk	91 25 / efficient	8 75		
	B	Average 11 Hour work days 5 days/wk	81 25 efficient	18 25		
	C	Average 12 Hour work days 5 days/wk	76 25efficient	23 75		
	D	Deferred Break Work 3hrs off 1 hr	2hr off	25 00		
		Clothing changes shower time & travel inclusive				
V	**Procedural Requirements**	Construction Management				9 30%
	A	Work Package sign offs		0	0 00%	
		1 A Package	45min/day	9 3	9 30 %	
		2 B Package	15 30min/day	3 13 6 25		
		3 C Package		0		
	B	Hot welding	10min	2 1		
	C	Confined space	10min	2 1		
		Varies with job				

Additional Factors **Total** **6.25%**

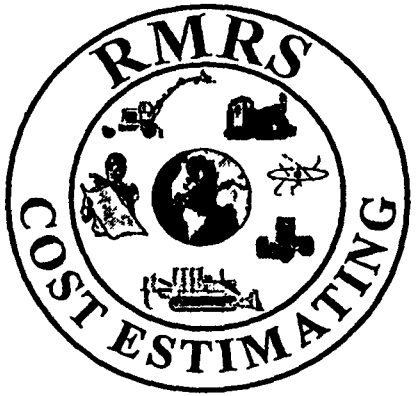
				Possible	Subtotal	Total
I	**Personal Access Control**	Time Study				0 00%
	A	Security Check		0 1	0 00%	
	B	MAA Security Chec 729 x4 =2 9min	2 trips in/out	6		
		729 x 8 =5 8 min	4 trips in/out	1 2		
II	**Building Access Control**	Construction Management				0 00%
	A	No overnight material storage multiple material deliveries		1		
	B	No overnight material storage multiple material deliveries		3 25		
III	**Building Layout**	Time Study & RI internal letter June 3,1987				0 00 %
	A	Distance from Locker Room to MAA Security Check				
		1 1366 x 4 =4 5 min	2 trips in/out	0 9		
		1 1366 x 8 =9 min	4 trips in/out	1 8		
	B	Distance from MAA Security Check to Work Area				
		1 1366 x 4 =6 min	2 trips in/out	1 2		
		1 1366 x 8 =12 min	4 trips in/out	2 5		
	C	Distance from Cafeteria to locker				
		1 35 x 4 =5 4min	2 trips in/out	1 1		
		(for use with breaks)				
	D	Inordinate circumstances		2		
		2 5 x 4 =10 min	2 trips in/out	2		
		2 5 x 8 =20 min	4 trips in/out	4		
IV	**Contamination**					0 00%
	A	Category s 1 4		0		
	B	Category 5		1		
	C	Category 6		2		
V	**Monitoring**	Time Study& Prove Study August 15, 1989				0 00 %
	A	Self monitoring at combo	1 min 4min	0 8		
	B	Monitor out except lunch &end of day	3 5 min 14mi	2		
	C	Monitor out at lunch	8 8 min 8 8mi	1 8		
	D	Monitor out at end of day	5 1 min 5 1mi	1 1		
		No of times may vary assume 4 ea				

VI	**Procedural Requirements**	Construction Management					6 25 %
A	Pre evolution Meetings						
1	One meeting per week		30min/wk/man		1 25		
2	One meeting per week		60min/wk/man		2 5		
3	One meeting per day	30 min	30min/dy/man		6 25	6.25 %	
4	One meeting per day	60 min	60min/dy/man		12 5		
VII	**Shower**	RI internal letter June 3,1987			[redacted]		0 00 %
A	N/A				0	0 00%	
B	End of day		9 min		1 9		
C	Deferred Break		N/A	0	0		
D	Breaks Lunch End of day	9min x 4=	36 min		7 5		
VIII	**Clothing change**	RI internal letter June 3,1987			[redacted]		0 00%
	6 minutes allowable	Time Study	2 59 min				
A	Deferred Break		N/A	0	[redacted]	0 00%	
B	0 breaks lunch & home		6 min x 2 =	12	2 5		
C	Tyvex		10 min x 2 =	20	5 0		
D	Anti C s		15 min x 2 =	30	4 2		
E	Fully encapsulating suits		20 min x 2 =	40	8 3		
F	2 breaks lunch &home		6 min x 4 =	24	5 0		
G	Tyvex		10 min x 4 =	40	8 3		
H	Anti C s		15 min x 4 =	60	12 5		
I	Fully encapsulating suits		20 min x 4 =	80	16 7		

Building Factors

Fixed Price & CPFF Construction

Effective March 6, 1995



	Category 1	2	3	4	5	6
	Buffer Zone	Out of Doors Within Plant Facilities 111(1st Floor) 112 122 123 124 125 130 331 334 551 850	Secured Area Out of Doors & Bldgs 111(2nd Floor) 121 441 443 460	Cold Areas Bldgs 371 374 444 447 559 707 764 765 771 774 776 777 779 865 881 883 886 991	Hot Areas Bldgs 444 447 865 886 883 991	Hot Areas Bldgs 371 374 559 707 771 774 776 777 779
Work Factors Constraints						
I Personal	0 00%	4 00%	0 00%	0 00%	4 00 /	4 00%
II Fatigue	0 00%	27 00%	0 00%	0 00%	2 00%	2 00%
III Delay	0 00%	0 00%	0 00%	0 00%	0 00%	0 00%
IV Production Efficiency	0 00%	0 00%	0 00%	25 00%	25 00%	25 00 /
V Procedural Requirements	9 30%	0 00%	0 00%	0 00%	0 00%	0 00%
Additional Factors						
I Personal Access Control	0 00%	0 00%	0 00%	0 00%	0 60%	0 60%
II Building Access Control	0 00%	0 00%	0 00%	0 00 /	1 00%	3 25%
III Building Layout	0 00%	0 00%	0 00%	0 00%	2 10%	2 10%
IV Contamination	0 00%	1 00%	0 00%	0 00%	1 00%	2 00%
V Monitoring	0 00%	2 90%	0 00%	0 00%	3 70%	3 70%
VI Procedural Requirements	6 25%	6 25%	0 00%	0 00%	1.25%	1 25%
VII Shower	0 00%	7 50%	0 00%	0 00%	0 00%	0 00%
VIII Clothing Change	0 00%	12.50%	0 00%	0 00%	0 00%	0 00%
Total Percent Increase Labor Cost	16 1%	70 5%	0 0%	25 0%	43 6%	47 9%
Baseline Building Factor	0 0%	0 0%	0 0%	25 0 /	43 6%	47 9%

Building Factors for buildings not listed should be complied by the cost engineer from the individual percents shown above
Good judgment should be used when applying the above factors to ensure that all elements are appropiate for the particular project
Defered Break method utilized

Building Factor Evaluation Category 2 [redacted] Base Line Factors Building Factor 70 50%

Project Location Low Level Operations & First Layers of Cap Construction

Work Factors 1 3100 x Additional Factors 1 3015 Equals Building Factor

Work Factors Constraints Total 31 00 %

			Possible	Subtotal	Total
I	**Personal**	DOD 5010.15.1 M	[redacted]		4 00%
	A	Basic(go to rest room get drink of water phone etc)	4	4 00%	
	B	Slightly disagreeable conditions poor heating	3		
	C	Extremely disagreeable most of the time hot objects ordors & fumes or excessive temperatures and or humidity	6		
II	**Fatigue**	DOD 5010.15.1 M & Rad. Protection Mgt. July/Aug 94	[redacted]		27 00 %
	A	Position Class			
		Working in close cramped positions	0 7		
	B	Mental			
		Routine work committed to habit	[redacted]	0 00%	
		Full attention copying checking or calculating	2		
		Concentrated attention nonroutine	4		
		Deep concentration inspection work requiring interpretation and discretion of unfamiliar nature	8		
	C	Lighting			
		Normal light at least 75 candle power	[redacted]	0 00%	
		Looking through drybox windows	1		
		Less than 75 candle for normal work or 125 candle for close work	2		
	D	Noise			
		Normal <60 dec	[redacted]	0 00 /	
		Constant noise such as machine shop > 60 dec	1		
		Average constant noise with loud sharp intermittent noise such as punch press sheetmetal shop etc	2		
	E	Restrictive safety devices			
		1 Safety glasses	[redacted]	0 00%	
		2 Protective clothing			
		Whites	[redacted]	0 00 %	
		Tyvex	1		
		Anti C s	2	2.00%	
		Fully encapsulating suits	3		
		Lead apron	3		
		3 Face shield	2		
		4 Heavy tight fireproof coat and shield	1 5		
		5 Filter mask	5		
		6 Respirator			
		Half face	18		
		Full face	25	25 00%	
		Supplied air	31		
		7 Glove box	1 5		

III	**Delay**	DOD 5010.15.1 M				0 00%
	A	Isolated job Little coordination with adjacent jobs		1		
	B	Fairly close coordination with adjacent job		2		
	C	Work in close proximity of building operations		1 50		
IV	**Production Efficiency**	Mean s & Richardsons s				0 00%
	A	Average 10Hour work days 5 days/wk	91 25 / efficient	8 75		
	B	Average 11 Hour work days 5 days/wk	81 25 efficient	18 25		
	C	Average 12 Hour work days 5 days/wk	76 25efficient	23 75		
	D	Deferred Break Work 3hrs off 1 hr	2hr off	25 00		
		Clothing changes shower time & travel inclusive				
V	**Procedural Requirements**	Construction Management				0 00%
	A	Work Package sign offs			0 00%	
		1 A Package	45min/day	9 3		
		2 B Package	15 30min/day	3 13 6 25		
		3 C Package		0		
	B	Hot welding	10min	2 1		
	C	Confined space	10min	2 1		
		Varies with job				

Additional Factors — **Total** 30 15%

				Possible	Subtotal	Total
I	**Personal Access Control**	Time Study				0 00%
	A	Security Check		0 1	0 00%	
	B	MAA Security Chec 729 x4 =2 9min	2 trips in/out	6		
		729 x 8 =5 8 min	4 trips in/out	1 2		
II	**Building Access Control**	Construction Management				0 00%
	A	No overnight material storage multiple material deliveries		1		
	B	No overnight material storage multiple material deliveries		3.25		
III	**Building Layout**	Time Study & RI internal letter June 3,1987				0 00%
	A	Distance from Locker Room to MAA Security Check				
		1 1366 x 4 =4 5 min	2 trips in/out	0 9		
		1 1366 x 8 =9 min	4 trips in/out	1 8		
	B	Distance from MAA Security Check to Work Area				
		1 1366 x 4 =6 min	2 trips in/out	1 2		
		1 1366 x 8 =12 min	4 trips in/out	2 5		
	C	Distance from Cafeteria to locker				
		1 35 x 4 =5 4min	2 trips in/out	1 1		
		(for use with breaks)				
	D	Inordinate circumstances		2		
		2 5 x 4 =10 min	2 trips in/out	2		
		2 5 x 8 =20 min	4 trips in/out	4		
IV	**Contamination**					1 00 %
	A	Category's 1 4		0		
	B	Category 5		1	1 00%	
	C	Category 6		2		
V	**Monitoring**	Time Study& Prove Study August 15, 1989				2 90 /
	A	Self monitoring at combo	1 min 4min	0 8		
	B	Monitor out except lunch &end of day	3 5 min 14mir	2		
	C	Monitor out at lunch	8 8 min 8 8mi	1 8	1 80 %	
	D	Monitor out at end of day	5 1 min 5 1mi	1 1	1 10%	
		No of times may vary assume 4 ea				

VI	**Procedural Requirements**	Construction Management			0		6 25 /
A	Pre evolution Meetings						
	1 One meeting per week		30min/wk/man		1 25		
	2 One meeting per week		60min/wk/man		2 5		
	3 One meeting per day	30 min	30min/dy/man		6 25	6 25 /	
	4 One meeting per day	60 min	60min/dy/man		12 5		
VII	**Shower**	RI internal letter June 3,1987			0		7 50 /
A	N/A				0	0 00 /	
B	End of day		9 min		1 9		
C	Deferred Break		N/A	0	0		
D	Breaks Lunch End of day	9min x 4=	36 min		7 5	7 50 /	
VIII	**Clothing change**	RI internal letter June 3,1987			0		12 50 /
	6 minutes allowable	Time Study	2 59 min				
A	Deferred Break		N/A	0	0	0 00 /	
B	0 breaks lunch & home		6 min x 2 =	12	2 5		
C	Tyvex		10 min x 2 =	20	5 0		
D	Anti C s		15 min x 2 =	30	4 2		
E	Fully encapsulating suits		20 min x 2 =	40	8 3		
F	2 breaks lunch &home		6 min x 4 =	24	5 0		
G	Tyvex		10 min x 4 =	40	8 3		
H	Anti C s		15 min x 4 =	60	12 5	12 50 /	
I	Fully-encapsulating suits		20 min x 4 =	80	16 7		

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escalation R f D t	31 Aug-95
Activity Start D t	1-Jul-95
Activity Finish D t	1-Dec-95

MIDPOINT DETERMINATION

Determination of number of days from start of activity t midpoint	77
Determination of umbe of days from ref ence date t midpoint f activity	16
Determination of numbe f months from ference date to midpoint of activity	1
Activity M dpoint D t	15-Sep-95

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dates for reference dat activity st rt and finish dates withing the Activity Dates box. The program will calculat and provide an escal tion multiplie based on those dates and the escalation rates provided

2 If project extends beyond the yea 2010 see the program developer to make the required additions to the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	0
FY97	0
FY98	0
FY99	0
FY2000	0
FY01	0
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1.80%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 0.29%

Engineering

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escal tion Ref Dat	31 Aug-95
Activity Start D t	1 Sep-95
Activity Finish D t	1 Dec-95

MIDPOINT DETERMINATION

Determination f number f days from start f activity to midpoint	46
Determination of umbe of days from reference dat to midpoint f activity	47
Determination of number f months from reference dat to midpoint f activity	2
Activity Midpoi t D t	16-Oct 95

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dates for reference dat activity start and finish dates within the Activity Dates box. The program will calculate and provide an escalation multiplier based on those dates and the escalation rates provided

2 If project xtends beyond the year 2010 see the program developer to make the required additions to the program.

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	1
FY97	0
FY98	0
FY99	0
FY2000	0
FY01	0
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1.60%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 0.58%

Permitting

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escal tion R f D t	31 Aug-95
Activity Start D t	22-Jan-96
Activity F nish D t	23-Aug-96

MIDPOINT DETERMINATION

Determination f umber of days from start f activity to midpo t	107
Determination of number of days from ref rence date t midpoint of activity	251
Determination of number f months from reference date to midpoint f ctivity	8
Activity Midpoint D t	6-May-96

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dates for reference date activity start and finish dates within the Activity D tes box. The program will calculate and provide an escalation multiplier based on those dates and the escalation rates provided

2 If project extends beyond the year 2010 see the program developer t make the required additions to the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	7
FY97	0
FY98	0
FY99	0
FY2000	0
FY01	0
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1.80%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 2.34%

Construction Mgmt & Insp and Project Construction

92

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escalation R f D t	31 Aug-95
Activity Start D t	1-Jul-95
Act vity Finish D t	30-Sep-96

MIDPOINT DETERMINATION

Determination of umbe of days from st rt f activity t midpoi t	229
Determination of umbe f d ys from reference dat to midpoi t of ctivity	168
Det rmination of numbe of months from reference dat t midpoi t f act vity	6
Activity M dpoint D t	14 Feb-96

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dat for reference date ctivity start and finish dates withing the Activity Dates box. The program will calculate and provide an escalation multiplie based on those dates and the escalation rat provided

2 If project xtends beyond the year 2010 see the program developer to make the required additions to the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	5
FY97	0
FY98	0
FY99	0
FY2000	0
FY01	0
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1.80%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE

Project Management

93

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escalation R f D t	31 Aug-95
Activity Start D t	30-Sep-96
Activity Finish Dat	1 Oct-01

MIDPOINT DETERMINATION

Determination of numbe of days from start of activity to midpoint	914
Determination of number f days from reference dat t midpoi t f activity	1 310
Det rmination f mber of months from ference dat to midpoint f ct vity	43
Activity M dpoi t D t	1 Apr 99

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dates for reference dat activity start and finish dates withing the Activity Dates box. The program will calculate and provide an escalation multiplier based on those dates and the escalation rat provided

2 If project xtends beyond the year 2010 see the program developer to make the required ddituons t the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	12
FY97	12
FY98	12
FY99	6
FY2000	0
FY0	0
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1 60%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3 50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 13.03%

Operations

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell Cap

ACTIVITY DATES

Escalation R f D t	31 Aug-95
Activity St rt D t	1 Sep-00
Activity Finish D t	1 Oct-01

MIDPOINT DETERMINATION

Determination of umber of days from start t activity to midpoint.	198
Determination of umber of days from reference dat to midpoint of act vity	2 026
Determination of umber f months from reference d t t midpoint f activity	67
Activity Midpoint D t	17 Mar-01

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 Use shall input correct dates for reference date activity start and finish dates within the Activity Dates box. The program will calculate and provide an escalation multipl er based on those dates and the escalation rates provided

2 If project xtends beyond the year 2010 see the program developer to make the required additions t the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	12
FY97	12
FY98	12
FY99	12
FY2000	12
FY01	6
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1 60%
FY94	2.50%
FY95	3.50%
FY96	3 50%
FY97	3 50%
FY98	3.50%
FY99	3.30%
FY2000	3 30%
FY2001	3.30%
FY2002	3 30%
FY2003	3.30%
FY2004	3 30%
FY2005	3.30%
FY2006	3 30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 20.61%

Engineering Cap

95

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell Cap

ACTIVITY DATES

Escalation Ref D t	31 Aug-95
Activity St rt D t	1 Sep-00
Activity Finish D t	1 Oct-02

MIDPOINT DETERMINATION

Determination of umbe of days from start f activity t midpoi t	380
Determination of number of days from reference dat t midpoi t f ct vity	2 208
Det rmination of umber f months from reference dat to midpoi t of activity	73
Activity M dpoint D t	16-Sep-01

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1. User shall input correct dates for reference dat activity start and finish dates withing the Activity D tes box. The program will calculat and provide an escalation multiplier based on those dates and the escalation rates provided
2. If project extends beyond the yea 2010 see the program developer t make the requred additions to the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	12
FY97	12
FY98	12
FY99	12
FY2000	12
FY01	12
FY02	0
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1.80%
FY94	2.50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 22.57%

Project Management Cap

96

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell Cap

ACTIVITY DATES

Escalation R t D t	31 Aug-95
Activity Start D t	1 Dec 01
Activity F nish Dat	1 Oct-02

MIDPOINT DETERMINATION

Det rmination of umber f days from start f activity t midpoi t	152
Determinat on f numbe of days from ref nce dat t midpoi t of ctivity	2 436
Det rmination f umbe of months from refe nce dat t midpoint f ctivity	80
Activity M dpoint D t	2 M y-02

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1. User shall input correct dates for reference date activity start and finish dates within the Act'vity D tes box. The program will calculate and provide an escalation multiplie based on those dates and the escalation rates provided
2. If project extends beyond the year 2010 see the program developer to mak the required dditions t the program

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	12
FY97	12
FY98	12
FY99	12
FY2000	12
FY01	12
FY02	7
FY03	0
FY04	0
FY05	0
FY06	0
FY07	0
FY08	0
FY09	0
FY10	0

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1 80%
FY94	2.50%
FY95	3.50%
FY96	3 50%
FY97	3.50%
FY98	3.50%
FY99	3 30%
FY2000	3 30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3 30%
FY2010	3.30%

ESCALATION PERCENTAGE 

Construction Mgmt & Insp and Project Construction Cap

ESCALATION PERCENTAGE CALCULATION

Project Title LL / MW CRCLA Waste Cell

ACTIVITY DATES

Escalation Ref D t	31 Aug 95
Activity Start D t	1-Oct-02
Act vity Finish D t	1-Oct-32

MIDPOINT DETERMINATION

Determination of number of days from start of activity t midpoint	5 479
Determination of numbe f days from reference dat to midpoint of ctivity	8 067
Determination of umber of months from reference dat t midpoint f activity	265
Act vity Midpoint D t	1-Oct 17

INSTRUCTIONS ON USING THE ESCALATION MULTIPLIER PROGRAM

1 User shall input correct dates for reference dat activity tart and finish dates wthng the Act'vity Dates box. The program will calculat and provide an escalation multiplie based on those dates and the escalation rates provided

2 If project xtends beyond the year 2010 see the program developer to make the required ddtions to the program.

THIS SECTION DETERMINES NUMBER OF MONTHS BY FISCAL YEAR

FY93	0
FY94	0
FY95	1
FY96	12
FY97	12
FY98	12
FY99	12
FY2000	12
FY01	12
FY02	12
FY03	12
FY04	12
FY05	12
FY06	12
FY07	12
FY08	12
FY09	12
FY10	12

WASTE MGMNT CONST

ESCALATION PERCENTAGES BY FISCAL YEAR

FY93	1 80%
FY94	2 50%
FY95	3.50%
FY96	3.50%
FY97	3.50%
FY98	3.50%
FY99	3.30%
FY2000	3.30%
FY2001	3.30%
FY2002	3.30%
FY2003	3.30%
FY2004	3.30%
FY2005	3.30%
FY2006	3.30%
FY2007	3.30%
FY2008	3.30%
FY2009	3.30%
FY2010	3.30%

ESCALATION PERCENTAGE 

Post Closure Activities

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CONTINGENCY ANALYSIS SUMMARY

PROJECT TITLE **LL / MW CRCLA Cell**
PROJECT NUMBER **989820-02** LOCATION **Sanitary Land Fill Cell 4**

CONTINGENCY RANGE & STANDARD MIDPOINTS

Estimate Type	Range	MP	Factor	Estimate Type	Range	MP	Factor
PLANNING	(20 % 50%)	30 /		TITLE II	(5 / 15 /)	10 0 /	
BUDGET (CDR)	(15 / 40 /)	28 /	35	CWE FP/MTC	(5 / 10 /)	7 5 /	
TITLE I	(10 / 20 %)	15 /		CWE CPFF	(10 / 15 /)	12 5 %	

ELEMENT OF COST	CATEGORY COST	PERCENT	CONTINGENCY DOLLARS
ENGINEERING (TITLE I II III)	$3 855 068	42 %	$ 1 628 540
CONSTRUCTION INSPECTION	$582 155	37 /	212 923
PROJECT & CONSTRUCTION MANAGEMENT	$9 586 934	32 /	3 019 884
IMPROVEMENT TO LAND	$176 760	42 /	74 703
NEW BUILDING	$566 288	38 %	216 534
BUILDING MODIFICATIONS	$0	0%	0
OTHER STRUCTURES	$12 411 979	38 %	4 746 030
SPECIAL FACILITY EQUIPMENT	$0	46 %	0
SPECIAL FACILITY INSTALLATION	$0	40 %	0
UTILITIES	$0	48 /	0
STANDARD EQUIPMENT	$0	36%	0
REMOVALS	$1	34 %	0
TOTAL	**$27 179 185**	**36 42%**	**$9 898 616**

ANALYSIS PERFORMED BY _____ Date _____

REVIEWED BY _____ Date 9/7/95

Engineering Design (Title I, II, III) 42%

		IMPORTANCE	MULTIPLIER
	A DESIGN COST SOURCE		
HIGH	Negotiated Contract	40 70	
	PDHE or A/E Proposal	70 95	0 95
	Normal Historical Percent	1 00	
	Assumed Percentage	1 05 1 10	
LOW	Other	40 1 10	
	B DESIGN COMPLEXITY		
HIGH	Routine Civil Design	70 90	
	Routine Process Design	90 1 05	1 05
	Unique Complex Construction	1 05 1 15	
LOW	Other	70 1 15	
	C METHOD OF ACCOMPLISHMENT		
HIGH	Design Build	90 1 05	
	EG&G Engineering	95 1 10	
	A/E BOA	95 1 10	1 10
LOW	Other	90 1 10	
	D DESIGN COMPLETENESS		
HIGH	Title II Stage	70 90	
	Title I Stage	95 1 05	
	Conceptual Stage	1 05 1 10	1 10
LOW	Other	70 1 10	

Multiplier

Risk Factor A	0 95
X Risk Factor B	1 05
X Risk Factor C	1 10
X Risk Factor D	1 10
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**42.24 %**

Construction Inspection

37%

	A INSPECTION COST SOURCE	IMPORTANCE	MULTIPLIER
HIGHER	Normal Historical Percent	90 1 00	
	Assumed Percentage	1 05 1 10	1 10
	Other	90 1 10	

	B DESIGN COMPLEXITY FACTORS		
HIGHER	Routine Construction Single Area	60 95	0 95
	Routine Construction Multiple Areas	1 00 1 10	
	Quality Level I or II Work	1 10 1 20	
	Other	60 1 20	

	C METHOD OF ACCOMPLISHMENT		
HIGHER	EG&G	95 1 00	1 00
	A/E	95 1 05	
	Other	95 1 05	

Multiplier

Risk Factor A	1 10
X Risk Factor B	0 95
X Risk Factor C	1 00
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**36 58 %**

Project & Construction Management 32%

	A P&CM COST SOURCE	IMPORTANCE	MULTIPLIER
HIGHER	More Complete than Needed	79 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
LOWER	Other	75 1 10	

	B DESIGN COMPLETENESS		
HIGHER	More Complete Than Needed	75 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
LOWER	Other	75 1 10	

	C CONSTRUCTION COMPLEXITY		
HIGHER	Recent Similar Construction	75 90	0 90
	Routine Cold Construction	1 00	
	Hot Manufacturing Bldg Construction	1 00 1 10	
	Contaminated Removals	1 05 1 15	
LOWER	Other	75 1 15	

	D SERVICE COMPLEXITY		
HIGHER	PM/CM Only Required	95 1 00	1 00
	Escort/RPT Services	95 1 05	
	Waste/Decon Required	1 00 1 10	
LOWER	Other	95 1 10	

Multiplier

Risk Factor A	1 00
X Risk Factor B	1 00
X Risk Factor C	0 90
X Risk Factor D	1 00
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**31 50 /**

Improvements to Land

42%

		IMPORTANCE	MULTIPLIER
A DESIGN COMPLETENESS			
H I G H E R	More Complete than Needed	70 95	
	Adequate for Level of Estimate	90 1 00	1 00
	Less Complete than Needed	95 1 05	
	Other	70 1 05	
B CONSTRUCTION COMPLEXITY			
H I G H E R	Routine	80 95	
	Extensive Sitework	90 1 00	
	Variable Soil Conditions	95 1 00	
	Soil Supply/Disposal of Excess	1 00 1 05	1 05
	Rock Blasting	1 00 1 10	
	Other	80 1 10	
C CONSTRUCTION SITE CONDITIONS			
H I G H E R	Unobstructed Area	95 1 00	1 00
	Limited Obstruction	95 1 00	
	Obstructed	1 00 1 05	
	Other	85 1 05	
D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS			
H I G H E R	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	1 05
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**42 26 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

New Buildings

38%

	A DESIGN COMPLETENESS	IMPORTANCE	MULTIPLIER
H I G H E R	More Complete than Needed	85 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
	Other	85 1 10	

	B CONSTRUCTION COMPLEXITY		
H I G H E R	Recent Similar Construction	75 85	
	Pre Engineered Building	85 95	0 95
	Routine Construction (Office/Lab/ Cold Manufacturing)	90 1 00	
	Hot Manufacturing Building	95 1 15	
	First Of A Kind Building	1 10 1 30	
	Other	75 1 30	

	C CONSTRUCTION SITE CONDITIONS		
H I G H E R	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	1 00
	Obstructed	1 00 1 10	
	Other	85 1 10	

	D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS		
H I G H E R	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	0 95
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**38 24 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

Building Modifications

0%

	A DESIGN COMPLETENESS	IMPORTANCE	MULTIPLIER
H I G H E R	More Complete than Needed	75 95	
	Adequate for Level of Estimate	1 00	
	Less Complete than Needed	1 05 1 10	
	Other	75 1 10	

	B CONSTRUCTION COMPLEXITY		
H I G H E R	Recent Similar Construction	85 1 00	
	Routine Remodel	90 1 05	
	Modification in Cold Manuf Bldg	1 00 1 15	
	Modification in Hot Manuf Bldg	1 05 1 30	
	Other	85 1 30	

	C CONSTRUCTION SITE CONDITIONS		
H I G H E R	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	
	Obstructed	1 00 1 10	
	Other	85 1 10	

	D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS		
H I G H E R	Fixed Price (FP)	85 1 15	
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1.20	
	Other	85 1 20	

Multiplier

Risk Factor A	0 00
X Risk Factor B	0 00
X Risk Factor C	0 00
X Risk Factor D	0 00
X Midpoint Range Factor	35 00
= Contingency Element Percentage	0 00 /

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

Other Structures

38%

	A DESIGN COMPLETENESS	IMPORTANCE	MULTIPLIER
HIGHER	More Complete than Needed	79 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
LOWER	Other	75 1 10	

	B CONSTRUCTION COMPLEXITY		
HIGHER	Recent Similar Construction	75 95	0 95
	Routine Construction	1 00	
	Sizing Based on Bldg or Process Specs	1 05 1 15	
LOWER	Other	75 1 15	

	C CONSTRUCTION SITE CONDITIONS		
HIGHER	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	1 00
	Obstructed	1 00 1 10	
LOWER	Other	85 1 10	

	D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS		
HIGHER	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
LOWER	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	0 95
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**38 24 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

Special Facility Equipment

46%

	DESIGN COMPLETENESS	IMPORTANCE	MULTIPLIER
H I G H E R	More Complete Than Needed	85 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete Than Needed	1 05 1 20	
	Other*	85 1 20	

B MATURITY OF TECHNOLOGY

H I G H E R	Vendor Quote Available	70 90	
	Recent Similar Acquisition	80 1 00	
	Defined Process Item (Hot or Cold)	95 1 15	
	Undefined Cold Process Item	1 05 1 30	1 30
	Undefined Hot Process Item	1 20 1 50	
	First Of A Kind Item	1 40 2 00	
	Other*	70 2 00	

C METHOD OF ACCOMPLISHMENT

H I G H E R	Off The Shelf	70 95	
	Off The Shelf W/Modifications	95 1 00	1 00
	Vendor Fabricated	1 00 1 10	
	Onsite Fabrication	1 05 1 15	
	DOE Contractor Supplied	1 05 1 20	
	Other	70 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	1 30
X Risk Factor C	1 00
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**45 50 %**

Special Facilities Install

40%

		IMPORTANCE	MULTIPLIER
A DESIGN COMPLETENESS			
HIGHER	More Complete than Needed	85 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
	Other	85 1 15	
B MATURITY OF TECHNOLOGY			
HIGHER	Recent Similar Construction	80 1 00	1 00
	Defined Process Area (Hot or Cold)	95 1 10	
	Undefined Cold Process Area	1 00 1 30	
	Undefined Hot Process Area	1 20 1 50	
	First Of A Kind Process	1 40 2 00	
	Other	80 2 00	
C CONSTRUCTION SITE CONDITIONS			
HIGHER	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	1 00
	Obstructed	1 00 1 10	
	Other	85 1 10	
D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS			
HIGHER	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	1 00
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**40.25 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

Utilities

48%

		IMPORTANCE	MULTIPLIER
A DESIGN COMPLETENESS			
HIGHER	More Complete than Needed	79 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 05 1 10	
	Other	75 1 10	
B CONSTRUCTION COMPLEXITY			
HIGHER	Recent Similar Construction	85 95	
	Routine Construction	90 1 00	
	Above Ground Utilities	1 00 1 10	
	Below Ground Utilities	1 05 1 20	1 20
	Other	85 1 20	
C CONSTRUCTION SITE CONDITIONS			
HIGHER	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	1 00
	Obstructed	1 00 1 10	
	Other	85 1 10	
D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS			
HIGHER	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	1 20
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**48 30 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

Standard Equipment

36%

		IMPORTANCE	MULTIPLIER
A DESIGN COMPLETENESS			
More Complete than Needed		60 85	
Adequate for Level of Estimate		70 90	0 90
Less Complete than Needed		95 1 10	
Other		60 1 10	
B PRICE ACCURACY			
Vendor Quote Available		50 70	
Recent Similar Acquisition		70 1 00	
Cold Process Item		90 1 05	
Hot Process Item		95 1 10	
Undefined Equipment (Hot or Cold)		1 00 1 15	1 15
Other		50 1 15	
C METHOD OF ACCOMPLISHMENT			
Off The Shelf		50 95	
Off The Shelf W/Modifications		95 1 00	1 00
DOE Contractor Supplied		95 1 10	
Other		50 1 10	

Multiplier

Risk Factor A	0 90
X Risk Factor B	1 15
X Risk Factor C	1 00
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**36.23 %**

Removals

34%

		IMPORTANCE	MULTIPLIER
	A DESIGN COMPLETENESS		
HIGHER	More Complete than Needed	60 95	
	Adequate for Level of Estimate	1 00	1 00
	Less Complete than Needed	1 00 1 15	
	Other	60 1 15	
	B REMOVAL COMPLEXITY		
HIGHER	Routine Demolition	75 85	0 85
	Underground Utilities	75 95	
	Cold Process Area	90 1 05	
	Hot Process Area	1 00 1 05	
	Contaminated Items	1 05 1 15	
	Disposal Complications	1 10 1 20	
	Other	75 1 20	
	C REMOVAL SITE CONDITIONS		
HIGHER	Unobstructed Area	85 95	
	Limited Obstruction	95 1 00	1 00
	Obstructed	1 00 1 10	
	Other	85 1 10	
	D METHOD OF ACCOMPLISHMENT/MARKET CONDITIONS		
HIGHER	Fixed Price (FP)	85 1 15	1 15
	EG&G Maintenance	95 1 05	
	Cost Plus Fixed Fee (CPFF)	1 00 1 20	
	Other	85 1 20	

Multiplier

Risk Factor A	1 00
X Risk Factor B	0 85
X Risk Factor C	1 00
X Risk Factor D	1 15
X Midpoint Range Factor	35 00
= Contingency Element Percentage	**34.21 %**

CONSTRUCTION SITE CONDITIONS

Unobstructed Minimal U/G Utilities Uncongested Area No Contamination
No Operating Processes

Limited Obstruction One of the Above Items Not True

Obstructed Two or More of the Above Items Not True

PROJECT NAME LL / MW CERCLA W t C 11
ESTIMATE NO 989820 02
AUTHORIZATION NO 989820

D iption 989820 02

Client Dav E i kson
(303)966 6965

Estimato Bry n L Lewi

Rat tabl 96/FP DIR

Document De ign Crit i P k g
dat d Aug 21 1995

PREVIOUS EST # 989820 01 B2
DOE COUNTERPART Chri Dayton
TYPE OF ESTIMATE Design Crit i
TYPE OF FUNDING Exp n e
WORK PACKAGE # 12962
CONSTRUCTION BY Fixed Pri e Cont t

Co t E timat App ovals

App ov l by th P j t Engin r ignifie cu of the ope
p s t d in the o t timate nd th pp op i t d ign co t

_____P oj t Engin

App ov l by P oj t Manag signifi s oncurr nc with p j t cope and
o t r p nted i the cost e timat

_____Proj t Manag

Repo t format DOE/PROJECT/Pha ord
Det il report
Print c ew
Print memo
Print ext nd d de iptions

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
TITLE I							
P j t Suppo t Cap							
001100 E gi i g (I teg t)							
02 RMRS Eng Spt Cap P	Landfill	467 00 h	Lab		467 00 hr	85 95	40 139
C w 483							
					Poj t Support Cap		40 139
					467 00 Labo hr		
j t Suppo t C 11							
001100 Engi ing (I t g to)							
02 RMRS Eng Spt Cel P	Landfill	680 00 hr	Lab		680 00 hr	85 95	58 446
C w 483							
02 RMRS En Sp C CDR P	Landfill	1 553 00 hr	Lab		1 553 00 hr	85 95	133 480
Crew 483							
				Engine ing (Integr			191 926
					2 233 00 Labo h		
					Poject Support C 11		191 926
					2 233 00 Labo hr		
					TITLE I		232 065
					2 700 00 Labo h		
TITLE II							
/E Engine ing Cap							
001100 Engi ing (I t g t)							
02 A/E Ttl II E Cap	La dfill	6 400 00 hr	Lab		6 400 00 hr	70 00	448 000
					A/E Engine ring Cap		448 000
					6 400 00 Labo hr		
/E Enginee ing Cell							
001100 E gi ing (I teg to)							
02 A/E Ttl II E C l	Landfill	6 400 00 hr	Lab		6 400 00 hr	70 00	448 000
					A/E Engine ring Cell		448 000
					6 400 00 Labo hr		

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	Wt	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
Poject Suppo t Cap							
001100 E gi i g (I t g t)							
02 RMRS Tt II E Sp C La dfill		375 00 h	Lab		375 00 hr	85 95	32 231
Cr w 483							
02 RMRS E g P Spt C p La dfill		258 00 h	Lab		258 00 hr	85 95	22 175
C 483							
02 RMRS E g P Sp Cp La dfill		283 00 h	Lab		283 00 hr	85 95	24 324
Cr w 483							
02 RMRS Eng P Sp Cp Landfill		307 00 h	Lab		307 00 hr	85 95	26 387
Cr w 483							
				Engin ri g (Int g			105 117
					1 223 00 Labo hr		
				Poject Suppo t C p			105 117
					1 223 00 Labo h		
oject Suppo t C 11							
001100 Engi i g (I t gr t)							
02 RMRS Tt II E Sp C Landfill		546 00 h	Lab		546 00 hr	85 95	46 929
Cr w 483							
02 RMRS Eng P Spt C l Landfill		376 00 hr	Lab		376 00 hr	85 95	32 317
Crew 483							
02 RMRS Eng P Sp Cl Landfill		412 00 hr	Lab		412 00 hr	85 95	35 411
Crew 483							
02 RMRS E g Po Sp Cl La dfill		448 00 hr	Lab		448 00 hr	85 95	38 506
C w 483							
				Engin ing (Integ			153 163
					1 782 00 Labo hr		
				Poject Support C 11			153 163
					1 782 00 Labo hr		
				TITLE II			1 154 280
					15 805 00 Labo hr		
TITLE III							
oject Suppo t C p							
001100 Engin i g (Integ to)							
03 RMRS Tt III En S C Landfill		817 00 hr	Lab		817 00 hr	85 95	70 221
Crew 483							
03 RMRS E Sp Cp Pr M Landfill		1 319 00 hr	Lab		1 319 00 hr	85 95	113 368
Cr w 483							

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				Engi ing (Integ			183 589
					2 136 00 Labo h		
				Poj t Suppo t C p			183 589
					2 136 00 Labo h		
Poj t Suppo t C ll							
001100 E gi ing (Integ t)							
03 RMRS Tt III En S C La dfill C 483		1 189 00 h	Lab		1 189 00 hr	85 95	102 195
03 RMRS E Sp Cl P M Landfill Crew 483		1 920 00 h	Lab		1 920 00 hr	85 95	165 024
				Engin ing (Integ a			267 219
					3 109 00 Labo h		
				Poject Support C ll			267 219
					3 109 00 Labo h		
				TITLE III			450 808
					5 245 00 Labo h		
CONST INSPECTION							
Poject Suppo t Cap							
001200 C nstru tio I pe tio							
01 Cn trctn I pc Cap Landfill C w 448		1 130 00 hr	Lab		1 130 00 hr	95 29	107 678
				Poject Support Cap			107 678
					1 130 00 Labo hr		
Poject Suppo t C ll							
001200 C nstru tio Inspection							
01 Cnstr tn Inspc C l Landfill Crew 448		1 130 00 hr	Lab		1 130 00 hr	95 29	107 678
				Poject Suppo t C ll			107 678
					1 130 00 Labo hr		

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
					CONST INSPECTION		215 355
					2 260 00 Labo h		
BUILDINGS (NEW)							
on F ility							
015104 T mpo y tiliti							
0100 T mp tiliti h t i l f l & ope tio p w k 12 hr pe day							
0100 Tuh fl&p p w 12 d y	LANDFILL	240 00 c fl	Lab	91429 mh/	219 43 mh	25 35	5 563
C SKWK			Mat 0		240 00 fl	18 85	4 524
				Tempo ry tiliti			10 087
					219 43 Labo h		
015254 S ff ld							
0800 S ff ldi g t l t b bldg i t fl		nt 1 pe mo p to 30	hi				
0800 S tbfl 1 mo 30	LANDFILL	585 00 f	Lab	26667 mh/ c	156 002 mh	24 52	3 825
C 3CARP			Mat 0		585 00 f	17 50	10 238
				S ff ld			14 063
					156 002 Labo h		
022238 E cvt g bulk bank me							
1300 E ti g f t d l d t k mtd 3 y p		130 C Y /hr					
1300 Efl mt 3 130 y/	LANDFILL	600 00 y	Lab	01154 mh/cy	6 924 mh	22 61	157
C w B10P			Eq	00769 mh/cy	4 614 mh	98 08	453
				Excvtng bulk bank me			609
					6 924 Labo h		
					4 614 Equip hr		
022274 Mobili t d d mobil tnn							
0100 Mobili ti d d mobili tio do		load 300 h p					
0100 Mbl nd d mb 1 300	LANDFILL	1 00 ea	Lab	2 10526 mh/	2 105 mh	27 13	57
Cr w B34K			Eq	4 21053 mh/	4 211 mh	47 34	199
0600 Mobili ti d d mob p		lf p opell d r pe 15 y					
0600 Mb dm prp 15	LANDFILL	1 00 a	Lab	2 58065 mh/	2 581 mh	27 13	70
C w B34K			Eq	5 16129 mh/	5 161 mh	47 34	244
1300 Mobili ti n nd demob t to hov l o FE load r 2 1/4 y							
1300 Mb dm t hv l 2 1/4	LANDFILL	1 00 ea	Lab	2 00000 mh/	2 00 mh	27 13	54
Cr w B34K			Eq	4 00000 mh/	4 00 mh	47 34	189
				Mobili tn and d mobi			814
					6 686 Labo h		
					13 372 Equip hr		
022308 Ba e ou							
0300 Bas ou ru h d 3/4 to ba ompa ted t 12 d p							
0300 B 3/4 b cm 12	LANDFILL	666 00 sy	Lab	01702 mh/ y	11 335 mh	22 494	255
Cr w B36			Mat 0		666 00 y	10 528	7 012
			Eq	01021 mh/ y	6 80 mh	45 993	313
				Ba ourse			7 579
					11 335 Labor hr		
					6 80 Equip hr		
031170 F rms pl 1 b g d							

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
3550 F rm i pl dg f rm fo d p d l b 4 t 24 high							
3550 F pl f 4 24 C Cl	LANDFILL	340 00 lf	Lab	18286 mh/lf	62 172 mh	22 713	1 412
			Mat 0		340 00 lf	872	296
			Eq	13714 mh/lf	46 628 mh	1 15	54
				F rms pl l b g			1 762
					62 172 Labo h		
					46 628 Equip h		
033126 C t dy mi							
0200 Co t dy mi gul ight 1 3 5 mix 3500 p i							
0200 C d m 1 3 5 3500 p 033134 Cu i g	LANDFILL	252 00 y	Mat 0		252 00 cy	51 714	13 032
0300 Cu i g ith p y d memb c i g ompo d							
0300 C p mem mp C w 2CLAB	LANDFILL	67 00 f	Lab	16842 mh/	11 284 mh	17 29	195
			Mat 0		67 00 f	2 099	141
				Cu ing			336
					11 284 Labo h		
033172 Pl i g o t							
1600 Pl ing & vib l bo & quip l v l b ov 10 thk pumped							
1600 P &vb lb& l 10 Cr w C20	LANDFILL	252 00 cy	Lab	42667 mh/cy	107 521 mh	20 398	2 193
			Eq	16000 mh/cy	40 32 mh	25 987	1 048
				Pl i g on t			3 241
					107 521 Labo hr		
					40 32 Equip h		
051235 P g d t l build g							
0200 PRE ENGD BLDG ABOVE FNDN 26GA COLORED ROOF/SIDES MAX							
0200 P b f 26 l / C w E2	LANDFILL	6 000 00 fl	Lab	00800 ch/fl	48 00 h	190 60	9 149
			Mat 0		6 000 00 fl	6 123	36 738
			Eq	00800 ch/fl	48 00 h	121 18	5 817
1000 ENGD BLDG 2 EAVE OVERHANG&SOFFIT							
1000 Engd bldg 2 v ov hn& Cr w E2	LANDFILL	340 00 lf	Lab	02222 ch/lf	7 555 h	190 60	1 440
			Mat 0		340 00 lf	7 152	2 432
			Eq	02222 ch/lf	7 555 ch	121 18	915
2400 ENGD BLDG DOOR&HWD 3 X7 DELUXE							
2400 Engd bldg d &h 3 7 C w 2SSWK	LANDFILL	4 00 opng	Lab	2 00000 h/op	8 00 h	56 72	454
			Mat 0		4 00 opng	293 265	1 173
3100 ENGD BLDG WINDOW FRAME ONLY 4 X3							
3100 Eng bl wn f o 4 3 C w E2	LANDFILL	3 00 opng	Lab	36364 h/op	1 091 h	190 60	208
			Mat 0		3 00 opng	66 885	201
			Eq	36364 h/op	1 091 h	121 18	132
6100 ENGD BLDG INSUL HVY VNYL & FOIL ADD							
6100 Eng bld i hv v& d	LANDFILL	6 630 00 f	Mat 0		6 630 00 f	051	338
6800 ENGD BLDG DBLE SASH GL & SCRNS 3X3							
6800 Engd bld dbl & 3 3 Cr w E1	LANDFILL	3 00 opng	Lab	57143 ch/op	1 714 ch	80 77	138
			Mat 0		3 00 opng	128 625	386
			Eq	57143 h/op	1 714 ch	9 45	16
				Pr engnrd t l bui			59 537
					417 663 Labo hr		
					58 36 Equip hr		
083604 Ov h d omme i l							
2450 Ov h d com fbgl & lum hvy dty ct l h hoi t 20 x 20 hi							
2450 Ov cm f& d 20 20 Cr w 2CARP	LANDFILL	2 00 ea	Lab	32 00000 mh/	64 00 mh	24 52	1 569
			Mat 0		2 00	3 648 00	7 296

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				Ov h d mme i l			8 865
					64 00 Labo h		
132051 T ks							
5000 Gall W t Tnk	LANDFILL	3 00	Lab	32 00000 hr/ a	96 00 h	30 028	2 883
C w Q7			Mat 0		3 00	3 982 00	11 946
V d qu t ti T k Pl							
5000 G l Cl W t Tnk	LANDFILL	1 00	Lab	32 00000 hr/ a	32 00 h	30 028	961
C w Q7			Mat 0		1 00	4 699 00	4 699
Ve do Qu t T nk Plu							
750 Gall S ttln Tnk	LANDFILL	3 00	Lab	8 00000 hr/	24 00 h	30 028	721
C w Q7			Mat 0		3 00	1 210 00	3 630
V nd Qu t ti T nk Plu							
				Tank			24 839
					152 00 Labo hr		
150001 Me h i l							
Pmp t f 903 Dc Pd	LANDFILL	1 00 l	Lab	80 00000 hr/ls	80 00 hr	32 10	2 568
Cr w PLUM			Mat 0		1 00 l	16 800 00	16 800
V lv Co ts	LANDFILL	1 00 l	Lab	80 00000 hr/l	80 00 hr	32 10	2 568
C w PLUM			Mat 0		1 00 l	24 750 00	24 750
Sp nkl Syst on fl	LANDFILL	6 000 00 f	Lab		6 000 00 f	1 16	6 960
Me s As embly p i i g pg 276			Mat 0		6 000 00 f	70	4 200
H ti g Sy t m	LANDFILL	6 000 00 f	Lab		6 000 00 f	2 42	14 520
Me n As mbly pg 301			Mat 0		6 000 00 f	2 67	16 020
B th ooms 3 Fixtu	LANDFILL	2 00	Lab		2 00 a	1 185 00	2 370
Me As mbly pg 273			Mat 0		2 00	1 084 00	2 168
AC C d Unit	LANDFILL	1 00 ea	Lab		1 00	2 05	2
Me ns SF p i ing pg 323			Mat 0		1 00 a	4 24	4
				Me hani l			92 930
					160 00 Labo hr		
160001 El t i l							
Ele t ic l I trmnt	LANDFILL	1 00 l	Mat 0		1 00 l	40 000 00	40 000
C w ELEC							
Ba d o Hist i l Fix d p i bid f 903 Decon F c							
Lighting Me Sf	LANDFILL	6 000 00 sf	Lab		6 000 00 f	88	5 280
Me ns As mbly pg337			Mat 0		6 000 00 f	73	4 380
Commun tn d alrms	LANDFILL	250 00 lf	Lab		250 00 lf	11 16	2 790
Me n As embly pg 363			Mat 0		250 00 lf	8 36	2 090
Po di t ibut Fd	LANDFILL	500 00 lf	Lab		500 00 lf	13 00	6 500
Mean As mbly pg 328			Mat 0		500 00 lf	10 00	5 000
Elect i l S rvi	LANDFILL	1 00	Lab		1 00	2 825 00	2 825
Mean As mbly pg 329			Mat 0		1 00	4 325 00	4 325
El t i l F de s	LANDFILL	250 00 lf	Lab		250 00 lf	49 00	12 250
Mean As embly pg 330			Mat 0		250 00 lf	61 00	15 250
Swit hg	LANDFILL	1 00 l	Lab		1 00 ls	4 000 00	4 000
Me ns Ass mbly pg 331			Mat 0		1 00 l	9 700 00	9 700
				El t i l			114 390
				Decon Facility			352 085
				1 375 017 Labor hr			
				170 093 Equip hr			

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
					BUILDINGS (NEW)		352 085
					1 375 017 Labo h		
					170 093 Equip h		
CONSTRUCTION MGMT							
P j t Suppo t C p							
001400 C tru ti Manag me t							
02 ES&H P Sp C p Landfill C b392		159 00 h	Lab		159 00 hr	90 74	14 428
02 W t Mgm P Spt Cp La dfill C w 237		329 00 hr	Lab		329 00 hr	78 94	25 971
02 ES&H P d Sp C p La dfill C b392		258 00 hr	Lab		258 00 hr	90 74	23 411
02 W t Mgm P Sp Cp Landfill C 237		115 00 h	Lab		115 00 hr	78 94	9 078
02 ES&H Tt III S Cp Landfill C w b392		134 00 h	Lab		134 00 hr	90 74	12 159
02 W t Mg Tt III Sp Cp La dfill C w 237		160 00 h	Lab		160 00 hr	78 94	12 630
03 ES&H Sy P Spt C p La dfill C w d048		104 00 h	Lab		104 00 hr	95 42	9 924
03 R d Hlt P Spt C p La dfill C w 421		79 00 h	Lab		79 00 hr	92 42	7 301
03 Rad Op P pt Cp La dfill C w 379		115 00 hr	Lab		115 00 hr	88 12	10 134
03 Emr Prp P Spt Cp La dfill C 321		372 00 h	Lab		372 00 hr	93 66	34 842
03 Fi P t P Spt Cp La dfill C w 308		11 00 h	Lab		11 00 hr	83 69	921
03 T &A Ttl III Spt C l La dfill C w d145		1 429 00 hr	Lab		1 429 00 hr	84 11	120 193
03 Cn t tn Ma gm C p Landfill C w 441		2 618 00 h	Lab		2 618 00 hr	102 88	269 340
				Constructi	Manag m		550 331
					5 883 00 Labo hr		
					Poject Suppo t C p		550 331
					5 883 00 Labo hr		
>oj ct Suppo t Cell							
001400 Co tru ti Manag me t							
02 ES&H P Sp C l Landfill C w b392		232 00 hr	Lab		232 00 hr	90 74	21 052
02 W t Mgm P Spt C l Landfill Cr w 237		480 00 hr	Lab		480 00 hr	78 94	37 891
02 ES&H P d Sp C l La dfill Cr w b392		376 00 h	Lab		376 00 hr	90 74	34 118
02 W t Mgm P Sp Cl La dfill Cr w 237		168 00 h	Lab		168 00 hr	78 94	13 262

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ITEM	DESCRIPTION	LOCATION	TAKEOFF QTY	Wt	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
02	ES&H Tt III S C w b392	Cl La dfill	196 00 h	Lab		196 00 h	90 74	17 785
02	W t Mg Tt III Sp C 237	Cl La dfill	234 00 h	Lab		234 00 hr	78 94	18 472
03	ES&H Sy P Spt C d048	1 La dfill	152 00 h	Lab		152 00 h	95 42	14 504
03	R d Hlt P Spt C 421	1 La dfill	116 00 h	Lab		116 00 h	92 42	10 721
03	R d Op P pt C w 379	1 La dfill	168 00 h	Lab		168 00 h	88 12	14 804
03	Em g Prp P Spt C w 321	1 La dfill	542 00 h	Lab		542 00 hr	93 66	50 764
03	Fi P t Pr Spt C Cr w 308	1 La dfill	16 00 h	Lab		16 00 h	83 69	1 339
03	T &A Ttl III Spt C Cr w d145	1 La dfill	2 080 00 h	Lab		2 080 00 hr	84 11	174 949
03	Cn t tn Ma gm C C 441	1 La dfill	2 618 00 hr	Lab		2 618 00 hr	102 88	269 340
					Constru ti n Managem			679 000
						7 378 00	Labo h	
					Poj t Suppo t C ll			679 000
						7 378 00	Labo h	
					CONSTRUCTION MGMT			1 229 331
						13 261 00	Labo h	

IMPROVEMENTS TO LAND

P imet F n ing

028308	F h i link i d t l							
0500	F n ba bed i 6 Ga wi g lv t el							
0500	Fn b b i 6 wi tl	LANDFILL	3 520 00 lf	Lab	12800 mh/lf	450 56 mh	23 243	10 472
C	B80			Mat 0		3 520 00 lf	11 515	40 533
				Eq	06400 mh/lf	225 28 mh	27 415	6 176
5070	F n doubl wing g t 6 high 20 opening							
5070	Fn dbl wn g 6 20	LANDFILL	1 00 opng	Lab	12 30769 mh/op	12 308 mh	23 243	286
Cr	B80			Mat 0		1 00 opng	390 852	391
				Eq	6 15385 mh/op	6 154 mh	27 415	169
					F n hain link ind			58 027
						462 868	Labo h	
						231 434	Equip hr	
					P rimet Fencing			58 027
						462 868	Labo hr	
						231 434	Equip hr	

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
Sit Lighting							
160001 El t i l							
S t L ghti g	LANDFILL	20 00	Lab		20 00	607 00	12 140
Me As mbly pg348			Mat 0		20 00 a	710 00	14 200
				El t i l			26 340
					Sit Lighting		26 340
St ging Ar							
033130 C t i pl							
4840 C n i pl lb GR W/t w l d fi NO f rm / i f 10 000 f 8 thk							
4840 C / f f/ 10 000 8	LANDFILL	13 550 00 f	Lab	02609 mh/ f	353 52 mh	21 24	7 509
C w C8A			Mat 0		13 550 00 f	1 338	18 130
St gi g	buildi g						
				Conc t in pl			25 639
					353 52 Labo h		
				Staging Ar			25 639
					353 52 Labo h		
				IMPROVEMENTS TO LAND			110 006
					816 387 Labo h		
					231 434 Equip h		
OTHER STRUCTURES							
Ac s Ro d							
022242 Ex v ti g bulk do							
Pu h d	La dfill	1 00 1	Lab	102 64800 mh/1	102 648 mh	22 61	2 321
Cr w B10W			Eq	102 64800 mh/1	102 648 mh	50 43	5 177
				Ex av ti g bulk do			7 497
					102 648 Labo h		
					102 648 Equip h		
022246 E v ti bulk pe							
0300 Ex v ti lev ting pe 11 C Y ommo th 1500 haul							
0300 E 11 e 1500		4 527 93 cy	Lab	02267 mh/cy	102 648 mh	22 923	2 353
Cr w B33F			Eq	01600 mh/cy	72 447 mh	85 85	6 220
				Ex v tio bulk			8 573
					102 648 Labo h		
					72 447 Equip hr		
022308 Ba o							
0300 Ba u ru hed 3/4 to ba ompact d to 12 d ep							
0300 B 3/4 b cm 12		13 577 78 y	Lab	01702 mh/ y	231 094 mh	22 494	5 198
Cr w B36			Mat 0		13 577 78 sy	10 528	142 947

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	Wt Eq	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				01021 mh/ y	138 629 mh	45 993	6 376
				B s r			
					231 094 Labo hr		154 521
					138 629 Equip h		
C p Constru tion					Acc Ro d		
					436 39 Labor hr		170 591
					313 724 Equip h		
021404 De t i g							
1700 De trg mp hole onst W/ v&gvl W/12 gvl coll 12 pipe							
1700 D h/& /12 12 16 Landfill		1 600 00 lf	Lab	16Ga			
Cr w B6			Mat 0	34286 mh/lf	548 576 mh		
			Eq	11429 mh/lf	1 600 00 lf	19 88	10 906
					182 864 mh	12 173	19 477
				De at ring		24 95	4 562
					548 576 Labo hr		34 945
					182 864 Equip hr		
022208 B kfill tru tu l							
3000 Ba kfill tru t l 105 H P 50 h l sand & g v l							
3000 B k t 105 hp 50 & La dfill							
Cre B10W		7 387 00 cy	Lab	00889 mh/cy	65 67 mh	22 61	1 485
Pl g v l			Eq	00593 mh/ y	43 805 mh	50 43	2 209
6 595 y l 12 hri k g f t r 7 387 cy of ompa t d							
g v l d d							
4400 Ba kfill tru t l 200 H P 300 haul nd & gr v l							
4400 Bck 200 hp 300 & Landfill		3 537 00 cy	Lab	01491 mh/ y	52 737 mh	22 61	1 192
Crew B10B			Eq	00994 mh/cy	35 158 mh	102 45	3 602
Sa d l yer							
3 158 cy l 12 hrink g f to 3 537 cy of and							
n eded							
4420 Ba kfill tru t l 200 H P 300 ha l ommon rth							
4420 Bk 200 hp 300 Landfill		6 453 00 cy	Lab	01633 mh/ y	105 377 mh	22 61	2 383
C B10B			Eq	01088 mh/cy	70 209 mh	102 45	7 193
S il cov r l y f ste							
5 866 cy l 10 h ink ge f t 6 453 cy of ompa ted							
oil n ed d							
4420 Bk 200 hp 300 r Landfill		14 001 00 cy	Lab	01633 mh/cy	228 636 mh	22 61	5 169
Cr B10B			Eq	01088 mh/cy	152 331 mh	102 45	15 606
Common fill l y r							
12 728 y l 10 h ink g f to 14 001 cy of							
compact d il n ed d							
4420 Bk 200 hp 300 Landfill		8 474 00 cy	Lab	01633 mh/ y	138 38 mh	22 61	3 129
Cr w B10B			Eq	01088 mh/cy	92 197 mh	102 45	9 446
Common fill with C bbl							
7 703 y l 10 h ink g f t r 8 474 y f ompa t d							
oil n eded							
Pl e l y r f l y Landfill		14 364 00 cy	Lab		14 364 00 cy	5 60	80 438
11 970 y l 20 sh inkag 14 364 cy f compa ted cl y			Eq		14 364 00 cy	6 15	88 339
Item from Me ns Sit Work & Land ape 1994 p 294 f r							
105 HP do e & h ps foot compa to in 8 lifts							

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ITEM DESCRIPT N	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				B kfill tru t 1			220 191
					590 801 Labo h		
					393 699 Equip h s		
022212 B							
0100 Bo b y&ld t p t h l 2 MI t& p d W/200 HP d				bank run gvl			
0100 Bblp2& w/200 d gvl La dfill		7 387 00 y	Lab	04667 mh/cy	344 751 mh	25 193	8 685
C B15			Mat 0		7 387 00 y	5 132	37 910
			Eq	04000 mh/ y	295 48 mh	67 37	19 906
0500 Bo buy&ld t pit h l 2mi t& p d W/200hp do			a d d d o bank				
0500 Bblp2& /200 d bnk Landfill		3 537 00 cy	Lab	04667 mh/cy	165 072 mh	25 193	4 159
C B15			Mat 0		3 537 00 cy	4 606	16 291
S d l y r			Eq	04000 mh/ y	141 48 mh	67 37	9 532
0600 Bo b y&ld t pit h l 2 MI t& p d W/200 HP d			l stru t F				
0600 Bbl2 t& /200 d f Landfill		20 454 00 y	Lab	04667 mh/ y	954 588 mh	25 193	24 049
C w B15			Mat 10		22 499 40 y	9 87	222 069
			Eq	04000 mh/ y	818 16 mh	67 37	55 119
0600 Bbl2 t& /200 d f La dfill		8 474 00 cy	Lab	04667 mh/cy	395 482 mh	25 193	9 963
Cr w B15			Mat 10		9 321 40 cy	11 87	110 645
Commo fill ith bbl			Eq	04000 mh/ y	338 96 mh	67 37	22 836
Pu h & t kpl ly La dfill		14 364 00 cy	Lab	01500 mh/cy	215 46 mh	22 61	4 872
C w B10S			Mat 0		14 364 00 y	3 70	53 147
It m f m Me Sit Wo k 1994 S	022216 It m 6040		Eq	01500 mh/ y	215 46 mh	39 73	8 560
				Bo ow			607 744
					2 075 353 Labo h s		
					1 809 54 Equip hr		
022222 Comp ti							
0300 Comp ti h p foot o w bbly wh l oll r 8 lift			ommon fill				
0300 Cm wob hl 8 fl La dfill		7 387 00 y	Lab	00923 mh/ y	68 182 mh	22 61	1 542
C w B10G			Eq	00615 mh/ y	45 43 mh	65 78	2 988
Comp ti f l y f g v l							
0400 Compa ti h p foot wobbly wh l roll 8 lift			l t fill				
0400 Cm wob hl 8 fl La dfill		6 453 00 cy	Lab	00800 mh/ y	51 624 mh	22 61	1 167
C w B10G			Eq	00533 mh/ y	34 394 mh	65 78	2 262
S il ov l y f w t							
0400 Cm wob hl 8 fl Landfill		3 537 00 y	Lab	00800 mh/cy	28 296 mh	22 61	640
C w B10G			Eq	00533 mh/ y	18 852 mh	65 78	1 240
Sand l y							
0400 Cm w b hl 8 fl La dfill		14 001 00 cy	Lab	00800 mh/cy	112 008 mh	22 61	2 533
Cr w B10G			Eq	00533 mh/cy	74 625 mh	65 78	4 909
Commo fill l y							
0400 Cm wob whl 8 fl Landfill		8 474 00 cy	Lab	00800 mh/cy	67 792 mh	22 61	1 533
Cr w B10G			Eq	00533 mh/ y	45 166 mh	65 78	2 971
Common fill with obbl							
				Compa tion			21 785
					327 902 Labor h s		
					218 469 Equip h s		
022704 E ion t ol							
Pl l y of GCL La dfill		169 600 00 sf	Lab	562 50000 sf/mh	301 511 mh	20 643	6 224
C w 10B1			Mat 0		169 600 00 f	70	118 720
Pl l y f G ynth ti Cl y Li (GCL) with 60 Mil							
HPDE g omemb ba king As ume c w of t n will install							
45 000 f f mat i l p day							
Pl l t l y flt fb La dfill		169 600 00 f	Lab	562 50000 f/mh	301 511 mh	20 643	6 224
C ew 10B1			Mat 0		169 600 00 f	37	62 752

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
Pl 1 t l y of G t til Filt F b i							
As m f b i ill be pl d by t ma w bl t							
i tall 45 000 f p d y							
Pl 2 d l y flt fb	Landfill	167 360 00 f	Lab	562 50000 f/mh	297 529 mh	20 643	6 142
C w 10B1			Mat 0		167 360 00 f	37	61 923
Pl 2 d laye f G t til Filt F b i							
As me f b i ill b pl d by t ma w bl to							
i t ll 45 000 f p d y							
Pl 3 d l y flt fb	La dfill	178 080 00 f	Lab	562 50000 f/mh	316 587 mh	20 643	6 535
C w 10B1			Mat 0		178 080 00 f	37	65 890
Pl 3 d l y f Ge t til Filt F b i							
Assume f b i ill be pl d by t n man w ble to							
inst ll 45 000 f pe d y							
				Erosio ont ol			334 410
					1 217 138 Labo h		
022712 Rip p							
0100 Rip p ma hi pl d fo l pe p t ti n							
0100 Rip rp pl f l p	La dfill	12 918 00 cy	Lab	25806 mh/cy	3 333 619 mh	24 905	83 024
Cr B12G			Mat 0		12 918 00 cy	13 16	170 001
			Eq	25806 mh/cy	3 333 619 mh	28 19	93 975
				Rip p			346 999
					3 333 619 Labo h		
					3 333 619 Equip h		
029304 S di g							
1100 S di g hyd o i di g fo lg W/ wood fibe mul h dd d							
1100 Sh w/ dd	La dfill	22 463 00 y	Lab	00270 mh/ y	60 65 mh	23 23	1 409
C B81			Mat 0		22 463 00 y	303	6 806
			Eq	00180 mh/ y	40 433 mh	34 625	1 400
				S ding			9 615
					60 65 Labo hr		
					40 433 Equip hr		
				Cap Construction			1 575 689
					8 154 039 Labo h		
					5 978 624 Equip hr		
Cell Ba thwo k							
022208 Ba kfill stru tur l							
4420 Ba kfill tru t l 200 H P 300 h ul ommon th							
4420 Bk 200 hp 300	Landfill	153 450 00 cy	Lab	01633 mh/cy	2 505 839 mh	22 61	56 657
Cre B10B			Eq	01088 mh/cy	1 669 536 mh	102 45	171 044
139 500 cy 1 10% sh ink g 153 450 cy of mat i l to							
be ompa t d							
				Ba kfill stru tu l			227 701
					2 505 839 Labo hr		
					1 669 536 Equip hr		
022212 Bo row							
0600 Bo row buy&ld t pit ha l 2 MI t&sp d W/200 HP do s l tru t F							
0600 Bb12 t& w/200 d f La dfill		100 100 00 cy	Lab	04667 mh/cy	4 671 667 mh	25 193	117 693
Cr w B15			Mat 10		110 110 00 cy	9 87	1 086 786
91 000 y 1 10% hrinkag 100 100 cy of bo row			Eq	04000 mh/cy	4 004 00 mh	67 37	269 749

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	Wt	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
d d							
					Bo ow		1 474 228
					4 671 667 Labo h		
					4 004 00 Equip hr		
022222 Comp ti							
0400 C mp ti h p foot wobbly wh l oll 8 lift l t fill							
0400 Cm w b hl 8 fl La dfill		153 450 00 y	Lab	00800 mh/ y	1 227 60 mh	22 61	27 756
C w B10G			Eq	00533 mh/ y	817 889 mh	65 78	53 801
					Comp ti n		81 557
					1 227 60 Labo hr		
					817 889 Equip h		
022246 E v ti b lk pe							
0300 Ex vati l v ti g p 11 C Y ommo th 1500 ha l							
0300 E 11 1500 La dfill		48 500 00 cy	Lab	02267 mh/ y	1 099 495 mh	22 923	25 204
C B33F			Eq	01600 mh/cy	776 00 mh	85 85	66 620
				Ex vation bulk			91 823
					1 099 495 Labo h		
					776 00 Equip h		
					C 11 Ea thwo k		1 875 310
					9 504 601 Labo h		
					7 267 425 Equip h		
11 Lin							
022208 Ba kfill tru t l							
3000 B kfill tru t l 105 H P 50 ha l d & g v l							
3000 Bck t 105 hp 50 & Landfill		1 543 00 cy	Lab	00889 mh/ y	13 717 mh	22 61	310
Cr w B10W			Eq	00593 mh/cy	9 15 mh	50 43	461
Pl 1 t l v l f d i ag g v l o bottom							
1 377 y 1 12 h inkag f to 1 543 y of compact d							
g vel d d							
3000 Bck t 105 hp 50 & Landfill		1 543 00 cy	Lab	00889 mh/cy	13 717 mh	22 61	310
Cr w B10W			Eq	00593 mh/cy	9 15 mh	50 43	461
Plac 2 d l v l f d inag g v l on bottom							
1 377 y 1 12 h inkag f t r 1 543 cy f ompa t d							
g v l d d							
4420 Ba kfill tru tu l 200 H P 300 h l ommon th							
4420 Bk 200 hp 300 Landfill		6 484 00 cy	Lab	01633 mh/cy	105 884 mh	22 61	2 394
Cr w B10B			Eq	01088 mh/cy	70 546 mh	102 45	7 227
Soil ov lay fo lin							
Pl 1 t l y l y La dfill		21 222 00 cy	Lab		21 222 00 cy	5 60	118 843
17 685 cy 1 20 h ink g 21 222 cy f ompa ted l y			Eq		21 222 00 cy	6 15	130 515
Item f om Me Sit Wo k & Land pe 1994 p 294 for a							
105 HP do & h p foot compa to in 8 lift							
					Ba kfill tru tural		260 523
					133 318 Labo hr		
					88 846 Equip hr		
022212 Bo ow							
0100 Bo ow buy&ld t pit haul 2 MI t& p d W/200 HP doz bank run gvl							
0100 Bblp2& w/200 d gvl La dfill		3 086 00 cy	Lab	04667 mh/cy	144 024 mh	25 193	3 628
Cr w B15			Mat 0		3 086 00 cy	5 132	15 837

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
			Eq	04000 mh/ y	123 44 mh	67 37	8 316
0600 Bo b y&ld t pit h l 2 MI t& p d W/200 HP d			1	tru t F			
0600 Bbl2 t& w/200 d f La dfill		6 484 00 y	Lab	04667 mh/cy	302 608 mh	25 193	7 624
C B15			Mat 10		7 132 40 y	9 87	70 397
Soil l y f li			Eq	04000 mh/ y	259 36 mh	67 37	17 473
5 895 y 1 10% h i k g 6 484 y of bo o d d							
Pu h & t kpl ly La dfill		21 222 00 y	Lab	01500 mh/cy	318 33 mh	22 61	7 197
C w B10S			Mat 0		21 222 00 cy	3 70	78 521
It m f om Me Sit W k 1994 S 022216 It m 6040			Eq	01500 mh/ y	318 33 mh	39 73	12 647
				Bo row			221 641
					764 962 Labo hr		
					701 13 Equip hr		
022222 Comp ti							
0300 Comp cti n h psfoot wobbly h l ll 8 lift ommon fill							
0300 Cm wob whl 8 fl Landfill		1 543 00 cy	Lab	00923 mh/cy	14 242 mh	22 61	322
Cr w B10G			Eq	00615 mh/cy	9 489 mh	65 78	624
Compa ti n f 1 t l y of d in g g v l							
0300 Cm wob whl 8 fl La dfill		1 543 00 cy	Lab	00923 mh/cy	14 242 mh	22 61	322
Cr w B10G			Eq	00615 mh/cy	9 489 mh	65 78	624
Compa ti n f 2 d l y of d in g g v l							
0400 Compa ti h p foot wobbly wh l oll 8 lift l t fill							
0400 Cm wob hl 8 fl La dfill		6 484 00 cy	Lab	00800 mh/ y	51 872 mh	22 61	1 173
Cr w B10G			Eq	00533 mh/ y	34 56 mh	65 78	2 273
Soil o l y f li							
				Compa tio			5 339
					80 356 Labo hr		
					53 539 Equip hr		
022704 E i n t ol							
Pl e l t l y GCL La dfill		159 173 00 f	Lab	562 50000 sf/mh	282 974 mh	20 643	5 841
C w 10B1			Mat 0		159 173 00 f	80	127 338
Pl l t l y f Geo ynth ti Cl y Li (GCL) with 80 Mil HPDE geomemb ba king As me c w of t will inst ll 45 000 f f mat i l pe day							
Pl l t l y flt fb Landfill		159 173 00 f	Lab	562 50000 f/mh	282 974 mh	20 643	5 841
Cr w 10B1			Mat 0		159 173 00 f	37	58 894
Pl c l t l y f Geot til Filt F b i Assume f bri will be pl d by a t n man ew bl to inst ll 45 000 f pe day							
Pl e l t l y gn t Landfill		121 973 00 f	Lab	562 50000 f/mh	216 841 mh	22 61	4 903
C w 10B10			Mat 0		121 973 00 f	37	45 130
Pl e l t l y f geo t on id only (not on th bottom) As me g ot will be pl ed by a ten man w that ill pl 45 000 f f mat i l pe day							
Pl 2nd l y flt fb Landfill		37 200 00 sf	Lab	562 50000 sf/mh	66 133 mh	20 643	1 365
Crew 10B1			Mat 0		37 200 00 sf	37	13 764
Pla e 2nd l ye f Geot til Filte F b i on bottom only Assume f b i will be pl ed by a t n ma ew abl t i st ll 45 000 f pe day							
Pla 2 d l y GCL Landfill		159 173 00 f	Lab	562 50000 f/mh	282 974 mh	20 643	5 841
Crew 10B1			Mat 0		159 173 00 f	80	127 338
Pla e 2nd l ye f Geo yntheti Cl y Lin (GCL) with an 80 Mil HPDE geomemb an backing Assume a ten man crew will i t ll 45 000 sf of materi l pe day							
Pl c 2nd l ye gnet Landfill		121 973 00 sf	Lab	562 50000 sf/mh	216 841 mh	22 61	4 903
Cr w 10B10			Mat 0		121 973 00 f	37	45 130

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
Pl 2 d l y f g t id ly (t o th bottom) As g t ill be pl d by t n man th t ill pl 45 000 f f mat i l p d y							
Pl 3 d l y flt fb La dfill		159 173 00 f	Lab	562 50000 f/mh	282 974 mh	20 643	5 841
C w 10Bl			Mat 0		159 173 00 f	37	58 894
Pl 3 d l ye f Ge t xtil Filt F b i As me f b i ill b pl d by t ma ew bl to i t ll 45 000 sf p d y							
Pl 4th l yr flt fb Landfill		37 200 00 f	Lab	562 50000 sf/mh	66 133 mh	20 643	1 365
C w 10Bl			Mat 0		37 200 00 f	1 00	37 200
Pl 4th l y f Ge t xtil Filte F b i on bottom nly As ume fab i ill be pl d by a t n man c w bl t in t ll 45 000 f p d y							
				E o ion ont ol			549 591
					1 697 845 Labo h		
						Cell Line	1 037 094
					2 676 481 Labo h		
					843 515 Equip hr		
Ev po tion P nd							
022208 Ba kfill tru tu l							
3000 Ba kfill tru t l 105 H P 50 haul nd & g vel							
3000 B k t 105 hp 50 & La dfill		2 349 00 cy	Lab	00889 mh/cy	20 883 mh	22 61	472
C w B10W			Eq	00593 mh/cy	13 93 mh	50 43	702
Pl l v l f d i g g v l on bottom 2 097 cy 1 12 hrink g f t 2 349 y f ompa ted g av l n d d							
4420 Backfill tru t l 200 H P 300 ha l ommon th							
4420 Bk 200 hp 300 La dfill		2 307 00 cy	Lab	01633 mh/ y	37 673 mh	22 61	852
Cr w B10B			Eq	01088 mh/cy	25 10 mh	102 45	2 572
Bottom p ot tive s il lay 2 097 cy 1 10% h ink ge 2 307 cy of mat i l to be ompa ted							
Pl l y f l y Landfill		11 232 00 cy	Lab		11 232 00 cy	5 60	62 899
9 360 cy 1 20 h ink ge 11 232 cy f ompa t d l y			Eq		11 232 00 cy	6 15	69 077
Item f om Me Sit Wo k & La d pe 1994 p 294 fo a 105 HP d & sh p foot ompact in 8 lift							
				Backfill tru t al			136 574
					58 556 Labo h		
					39 03 Equip hr		
022212 Bo r							
0100 Bo ow buy&ld t pit haul 2 MI t&sp d W/200 HP do e bank run gvl							
0100 Bblp2& w/200 d gvl Landfill		2 349 00 cy	Lab	04667 mh/cy	109 628 mh	25 193	2 762
Crew B15			Mat 0		2 349 00 cy	5 132	12 055
			Eq	04000 mh/cy	93 96 mh	67 37	6 330
0600 Bo row buy&ld t pit haul 2 MI t& p d W/200 HP do e s l tru t F							
0600 Bbl2 t& /200 d f Landfill		2 307 00 cy	Lab	04667 mh/cy	107 668 mh	25 193	2 712
C ew B15			Mat 10		2 537 70 cy	9 87	25 047
			Eq	04000 mh/cy	92 28 mh	67 37	6 217
Pu h & t kpl ly Landfill		11 232 00 cy	Lab	01500 mh/cy	168 48 mh	22 61	3 809
Crew B10S			Mat 0		11 232 00 cy	3 70	41 558
Item f om Me s Sit Wo k 1994 Sec 022216 Item 6040			Eq	01500 mh/cy	168 48 mh	39 73	6 694

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				Bo w			107 185
						385 776 Labo h	
						354 72 Equip h	
022222 Compa ti							
0300 C mp ti h p foot wobbly wh l ll 8 lift mmon fill							
0300 Cm ob hl 8 fl Landfill		2 349 00 y		Lab 00923 mh/ y	21 681 mh	22 61	490
C w B10G				Eq 00615 mh/ y	14 446 mh	65 78	950
Comp ti of l y f d i g g v l bottom							
0400 C mp ti h p foot bbly wh l oll 8 lift l t fill							
0400 Cm b hl 8 fl La dfill		2 307 00 y		Lab 00800 mh/ y	18 456 mh	22 61	417
C w B10G				Eq 00533 mh/cy	12 296 mh	65 78	809
P te tiv il l y							
				Compa ti n			2 667
						40 137 Labo h	
						26 743 Equip hr	
022246 E v ti bulk p							
0300 Ex v ti l v ting pe 11 C Y ommon th 1500 haul							
0300 E 11 1500 Landfill		28 062 00 cy		Lab 02267 mh/cy	636 166 mh	22 923	14 583
Cr B33F				Eq 01600 mh/ y	448 992 mh	85 85	38 546
				Ex v tion bulk			53 129
						636 166 Labo h	
						448 992 Equip hr	
022704 E i t l							
Pl l yr HDPE gmb La dfill		84 245 00 f		Lab 562 50000 f/mh	149 769 mh	20 643	3 092
C 10B1				Mat 0	84 245 00 f	70	58 972
Pl l y f 60 Mil HPDE g omemb ba king							
As ume c w of t n will i t ll 45 000 f of mat i l pe day							
Pl 1 t l y flt fb La dfill		56 640 00 f		Lab 562 50000 f/mh	100 693 mh	20 643	2 079
C 10B1				Mat 0	56 640 00 f	37	20 957
Pl 1 t l y f Ge t til Filt F b i on bottom o ly As me f b i will be pl d by t n man bl to inst ll 45 000 f pe day							
Pl 2 d l y flt fb La dfill		56 640 00 f		Lab 562 50000 f/mh	100 693 mh	20 643	2 079
Cr w 10B1				Mat 0	56 640 00 f	37	20 957
Pl c 2 d l y f Ge t til Filt F b i As me f b i will be pl d by t man w bl to inst ll 45 000 f pe day							
Pla l yr HDPE gmbrn Landfill		84 245 00 f		Lab 562 50000 f/mh	149 769 mh	20 643	3 092
C w 10B1				Mat 0	84 245 00 sf	70	58 972
Pl l y f 60 Mil HPDE g omemb n ba ki g Assume w f t will inst ll 45 000 sf of materi l pe day							
Pl l y g t Landfill		27 605 00 sf		Lab 562 50000 f/mh	49 076 mh	22 61	1 110
Crew 10B10				Mat 0	27 605 00 f	37	10 214
Pl e laye f g o t on sid ly (not on th bottom) Assume g t ill be pl ed by t n man w that will pla 45 000 f f mat i l pe day							
				E o io cont ol			181 521
						550 00 Labo hr	

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
					Ev po tion Pond		481 075
					1 670 634	Labo h	
					869 484	Equip h	
en R qmnt C p							
010001 Ge l R qui me t							
T i i g C t P l La dfill		1 00 l	Lab	40 00000 h/l	40 00 h	380 25	15 210
C w 15SKWK							
As m tot l f 15 k ill d 40 h f pla t							
p ifi t i i g							
Soil & C t t t g La dfill		1 00 l	S b		1 00 l	50 000 00	50 000
Si t ting qui ment t y t kn wn ume that							
$50 000 will th o t f mpl ing							
T il R t l La dfill		7 00 mo	Eq		7 00 mo	315 00	2 205
It m f t t fi ld ffi							
				Gen l R qui ement			67 415
					600 00	Labo h	
010036 Fi ld p nn l							
0120 Fi ld p nn l fi ld ngin v g							
0120 Fld p nn fld g La dfill		28 00 we k	Lab		28 00 w k	740 00	20 720
0260 Fi ld p onn l p i t d t ve g							
0260 Fld p s l p nt d v La dfill		28 00 w k	Lab		28 00 w k	1 125 00	31 500
				Fi ld p onn l			52 220
					2 240 00	Labo h	
013306 S rv yi g							
1100 S rv yi g w fo building l yo t 2 ma w							
1100 S f bl l 2 mn Landfill		140 00 day	Lab	16 00000 mh/dy	2 240 00 mh	24 60	55 104
C A6							
As ume rv y will be hi fo th du tion of th							
p oj t							
022274 Mobili t d d mobil tnn							
Mob / Demob Eqpme t La dfill		10 00	Lab	6 00000 h/	60 00 ch	27 13	1 628
Cr w B34K			Eq	6 00000 h/ a	60 00 h	94 68	5 681
As ume t t ill hav 10 pc of equipment to mov							
it							
				Mobili tn and demobi			7 309
					60 00	Labor h	
					120 00	Equip hr	
					Gen Reqmnt Cap		182 048
					5 140 00	Labor hr	
					120 00	Equip hr	
en Reqmnt C 11							
010001 Gen l Requi ement							
Soil & C t tstng Landfill		1 00 l	Sub		1 00 l	100 000 00	100 000
Sin e t ting qui me t not y t known sume that							
$100 000 will v th co t f mpl ing							
Tr i ing Co t P l Landfill		1 00 l	Lab	40 00000 h/l	40 00 h	760 50	30 420

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
C w 30SKWK							
As me t t l f 30 k ill d 40 h of pl t p ifi t i i g							
T il R t l	La dfill	8 00 mo	Eq		8 00 mo	315 00	2 520
It m f o t t fi ld ffi							
				G n l R qui m t			132 940
						1 200 00 Labo hr	
010036 Fi ld p l							
0120 Fi ld p l fi ld gi v g							
0120 Fld p n fld g	La dfill	32 00 k	Lab		32 00 w k	740 00	23 680
0260 Fi ld p l p i t d t v g							
0260 Fld p nnl p t d v	La dfill	32 00 w k	Lab		32 00 w k	1 125 00	36 000
				Fi ld p onn l			59 680
						2 560 00 Labo hr	
013306 S rv yi g							
1100 S rv yi g f buildi g l y t 2 man w							
1100 S f bl l 2 mn	La dfill	160 00 d y	Lab	16 00000 mh/dy	2 560 00 mh	24 60	62 976
C A6							
As me rv y ill be hi f th d tion of th p j t							
022274 Mobili t d d mobil tnn							
Mob / Demob Eqpme t	La dfill	20 00	Lab	6 00000 h/	120 00 h	27 13	3 256
C B34K			Eq	6 00000 h/	120 00 h	94 68	11 362
As m o t t will h v 20 pc of quipme t to move n it							
				Mobili t nd d mobi			14 617
						120 00 Labo h	
						240 00 Equip hr	
					Gen Requnt C 11		270 213
						6 440 00 Labo hr	
						240 00 Equip hr	
Le hat Sy tem							
027404 S pti t nk							
1350 S pti tank l a hing fi ld hambe heavy duty 20 x 4 x 1 6							
1350 St ch d 20 4 1 6	Landfill	1 00 a	Lab	11 20000 mh/ a	11 20 mh	20 903	234
Cr B13			Mat 0		1 00	769 86	770
			Eq	1 60000 mh/ a	1 60 mh	61 48	98
				Septic tanks			1 102
						11 20 Labo hr	
						1 60 Equip hr	
151551 Pipe pl ti							
0800 Pipe PVC hi imp/p plg 10 OC hg 3 pe 10 h d 40 12 di							
0800 Pp10 3 10 40 12	La dfill	300 00 lf	Lab	57143 mh/lf	171 429 mh	28 16	4 827
Cr w Q2			Mat 0		300 00 lf	46 454	13 936
				Pipe pl ti			18 764
						171 429 Labo hr	

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
					Le chat Sy tem		19 866
					182 629 Labo hr		
					1 60 Equip h		
L chat Tank							
021108 Cl i g							
0400 Cl i g bru h W/ bru h W/ d ball nd h i med l i g							
0400 Cbwb s / d h l La dfill		3 576	Lab	10 66667 mh/	38 144 mh	21 28	812
C w B11A			Eq	5 33333 mh/	19 072 mh	102 45	1 954
				Cl i g			2 766
					38 144 Labo h		
					19 072 Equip h		
022204 B kfill							
1700 Ba kfill d ba kfilli g ompa ting 6 t 12 lift h p foot l							
1700 B k d bk 6 12 l La dfill		266 667cy	Lab	01600 mh/ y	4 267 mh	22 61	96
C B10D			Eq	02133 mh/cy	5 688 mh	58 14	331
				Ba kfill			427
					4 267 Labo h		
					5 688 Equip h		
022212 Bo ow							
0320 B buy&ld t pit h l 2 MI t& p d W/200 HP do hd tn 3/4							
0320 Bb2 w/200 d 3/4 La dfill		7 822 222cy	Lab	04667 mh/ y	365 063 mh	25 193	9 197
Cr w B15			Mat 15		8 995 555 cy	18 753	168 694
			Eq	04000 mh/cy	312 889 mh	67 37	21 079
				Bo w			198 970
					365 063 Labo h		
					312 889 Equip hr		
022222 Compa ti							
0100 Compa tio t l wh l t ndem ll 10 ton							
0100 Cm whl tnd 10 tns Landfill		312 889hr	Lab	1 50000 mh/h	469 334 mh	22 61	10 612
C B10F			Eq	1 00000 mh/h	312 889 mh	27 60	8 636
0540 Compa tio t p be mobili ti nd d mobili tion minimum							
0540 Cmp tr p b m nd d Landfill		1 00 totl	Lab	101 58730 mh/tt	101 587 mh	23 859	2 424
Cr B8			Eq	50 79365 mh/tt	50 794 mh	64 805	3 292
				Compa ti n			24 963
					570 921 Labo hr		
					363 683 Equip hr		
022238 Excvtng bulk bank me							
0200 E v ting ba khoe hyd l mtd 1 y p 75 C Y /hr							
0200 Ebk mt 1 75 cy/ Landfill		1 186 667cy	Lab	02667 mh/cy	31 648 mh	24 905	788
Cre B12A			Eq	01333 mh/cy	15 818 mh	66 08	1 045
				Excvtng bulk bank me			1 833
					31 648 Labo hr		
					15 818 Equip hr		
022246 E v ti n bulk pe							
0300 Ex v tio l v ting c pe 11 C Y ommon th 1500 ha l							
0300 E s 11 1500 Landfill		1 880 00 cy	Lab	02267 mh/cy	42 62 mh	22 923	977
Cr w B33F			Eq	01600 mh/cy	30 08 mh	85 85	2 582
Pu h do	Landfill	1 00 l	Lab	43 24000 mh/l	43 24 mh	22 61	978

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ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	Wt	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
C w B10W			Eq	43 24000 mh/l	43 24 mh	50 43	2 181
				E v ti n bulk a			6 718
						85 86 Labo h	
						73 32 Equip h	
022274 Mobili t d d mobil tnn							
0020 Mobili ti d d mobili tion do o load 105 h p							
0020 Mbl d d mb 1 105 La dfill		1 00	Lab	2 00000 mh/	2 00 mh	27 13	54
C w B34K			Eq	4 00000 mh/	4 00 mh	47 34	189
0400 Mobili t d d mob p tow d type (in l t t) 10 y							
0400 Mb d t (t) 10 La dfill		1 00	Lab	2 50000 mh/	2 50 mh	27 13	68
C w B34K			Eq	5 00000 mh/	5 00 mh	47 34	237
0900 Mobili ti d d mob h v l ba kh o d gli 3/4 y							
0900 Mbl d dm s k d 3/4 La dfill		1 00	Lab	2 22222 mh/	2 222 mh	27 13	60
C B34K			Eq	4 44444 mh/	4 444 mh	47 34	210
				Mobili t nd d mobi			819
						6 722 Labo hr	
						13 444 Equip h	
031112 A h mf t ip							
5000 Chmf t wd 1/2 wid La dfill		1 440 00 lf	Lab	01495 mh/lf	21 528 mh	24 52	528
C CARP			Mat 10		1 584 00 lf	154	244
				Ac o ch mf t			772
						21 528 Labo hr	
031158 F rm i pl footi g							
0150 F rms i pl footi g o ti ou ll 4 u							
0150 F ms pl ft w 4 La dfill		720 00 f	Lab	06598 mh/ f	47 506 mh	22 713	1 079
C C1			Mat 10		792 00 f	441	349
			Eq	04948 mh/ f	35 626 mh	1 15	41
1000 F rms i pl int g l t t w ll to 4 high 1 s							
1000 Frm pl t 4 1 La dfill		36 00 lf	Lab	08000 mh/lf	2 88 mh	22 713	65
C C1			Mat 10		39 60 lf	1 18	47
			Eq	06000 mh/lf	2 16 mh	1 15	2
1500 Forms i pl k yw y 4 u t pe d wood 2 x 4							
1500 F m pl 4 w 2 4 La dfill		36 00 lf	Lab	01509 mh/lf	543 mh	24 52	13
C w CARP			Mat 10		39 60 lf	185	7
				Forms in pl e foot			1 605
						50 929 Labo h	
						37 786 Equip hr	
031170 Forms pl l b g d							
3000 Forms i pl dg forms to 6 high 4 o g ad							
3000 Frm pl d f 6 4 Landfill		2 352 00 lf	Lab	05333 mh/lf	125 432 mh	22 713	2 849
C e C1			Mat 10		2 587 20 lf	318	823
			Eq	04000 mh/lf	94 08 mh	1 15	108
3050 F rms in pl dg f rms 7 to 12 high 4 us on g d							
3050 F pl f 7 12 4 u Landfill		720 00 f	Lab	07356 mh/sf	52 963 mh	22 713	1 203
C w C1			Mat 10		792 00 f	954	756
			Eq	05517 mh/sf	39 722 mh	1 15	46
				Forms pl c l b g			5 784
						178 395 Labo h	
						133 802 Equip hr	
031182 F rms i pl w ll							
0500 F rms i pl bulkh d f rms fo w ll with k yw y 1 u 2 pi							
0500 Fpbl l t ky 1 2 Landfill		169 05 lf	Lab	18113 mh/lf	30 62 mh	23 787	728

ITEM	DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
C w C2				Mat 10		185 955 lf	2 462	458
				Eq	12075 mh/lf	20 413 mh	1 15	23
2150 F rm i pl j b built plyform w ll f rm to 8 high 4 u								
2150 F pl jb f 8 4 u	Landfill	6 955 20 f		Lab	09505 mh/ f	661 092 mh	23 787	15 725
C C2				Mat 10		7 650 72 f	811	6 205
				Eq	06337 mh/ f	440 751 mh	1 15	507
					F rms in pla w ll			23 647
						691 712 Labo hr		
						461 164 Equip h		
031198 W t t p								
3550 W t t p rubb t b lb plit 3/8 thi k 9 wid								
3550 Wt blb 3/8 9	La dfill	3 241 05 lf		Lab	05926 mh/lf	192 065 mh	24 52	4 709
C w CARP				Mat 10		3 565 155 lf	12 056	42 982
5250 W t t p fi ld i 3/8 9 wid								
5250 W t tp fld 3/8 9	La dfill	32 00 a		Lab	16000 mh/	5 12 mh	24 52	126
Cr w CARP				Mat 10		35 20	12 415	437
5550 W t top f tting rubb 3/8 thi k fl t s 9 wid								
5550 Wt ft b 3/8 9	La dfill	48 00		Lab	26667 mh/	12 80 mh	24 52	314
C w CARP				Mat 10		52 80	52 839	2 790
6050 W t t p f tti g rubbe 3/8 thi k fl t t 9 wid								
6050 Wt ft b 3/8 t 9	La dfill	32 00		Lab	26667 mh/	8 533 mh	24 52	209
C w CARP				Mat 10		35 20	44 631	1 571
7050 W t t p fitti g rubbe 3/8 thi k v ti l t 9 wid								
7050 Wt ft b 3/8 t 9	La dfill	32 00		Lab	32000 mh/	10 24 mh	24 52	251
C CARP				Mat 10		35 20	41 04	1 445
					W t t p			54 833
						228 758 Labo h		
032107 R i f i g i pl								
0600 R i f i g i pl A615 g d 60 l b n g d #3 to #7								
0600 Rn p 615 60 g #3 #7	Landfill	45 57 ton		Lab	13 91304 mh/tn	634 017 mh	27 10	17 182
C 4RODM				Mat 15		52 406 ton	482 50	25 286
0700 R inf i g i pl A615 g d 60 w lls #3 to #7								
0700 Rn p 615 g 60 #3 #7	La dfill	9 43 ton		Lab	10 66667 mh/tn	100 587 mh	27 10	2 726
C 4RODM				Mat 15		10 845 ton	482 50	5 233
					Reinfo ing in pl			50 426
						734 604 Labo h s		
033118 Cn t dmxt& u f t tmnt								
0800 C dmi & f t tmt cu ing cmpd p em GR (450 SF/gal) 55 gal lot								
0800 Cst (450 /) 55 lts	La dfill	110 00 g l		Mat 10		121 00 gal	11 965	1 448
033126 Con t dy mix								
0300 Conc t dy mi egul ight 1 3 5 mix 4000 p i								
0300 Crd m 1 3 5 4000 ps	Landfill	771 926cy		Mat 10		849 119 cy	52 728	44 772
033134 Cu ing								
0450 Cu ing cu i g bl nk t 1 to 2 thi k buy maximum								
0450 Crng ng bl 1 2	Landfill	44 000 00 sf		Mat 10		48 400 00 f	2 565	124 146
033168 P t hing co r t								
2200 Pat hing wall in l hipping l ning nd poxy gt maximum								
2200 Pt n wl h l gt	La dfill	7 200 00 f		Lab	20000 mh/ f	1 440 00 mh	24 11	34 718
Cr w CEFI				Mat 10		7 920 00 f	416	3 295
					Pat hing on t			38 013
						1 440 00 Labo h		
033172 Pl ing on et								
4600 Pl ing n & vib lab & quip lab on g d ove 6 thk dir hut								

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
4600 P vb lb&q 1 6 ht La dfill		636 926 y	Lab	29091 mh/ y	185 288 mh	20 103	3 725
C C6			Eq	09697 mh/cy	61 763 mh	4 23	261
5100 Pl i g & ib ting l b & quip ll 12 thi k pump d							
5100 Pl &vb lb&q 12 La dfill		135 00 y	Lab	67368 mh/ y	90 947 mh	20 398	1 855
C C20			Eq	25263 mh/ y	34 105 mh	25 987	886
				Pl ing on t			6 728
					276 235 Labo h		
					95 868 Equip hr		
033196 Wi t p t ti							
0050 Wi t pr t ti f h t d dy mi dd ma imum							
0050 W p t f htd dy m La dfill		775 00 y	Mat 10		852 50 cy	4 31	3 674
033454 Fi i hi g fl							
0250 Fi i hing floo mo lithi t l t l fi i h fo fini h floo							
0250 F fl m f f fl La dfill		26 000 00 f	Lab	01455 mh/ f	378 30 mh	24 11	9 121
C w C9			Eq	01455 mh/ f	378 30 mh	4 83	1 827
				Fini hing floo s			10 948
					378 30 Labo h		
					378 30 Equip h		
033458 Fi i hi g ll							
0010 Fi i hing w ll b k ti d pat h v id							
0010 F l b k n pt vd La dfill		7 200 00 f	Lab	01481 mh/ f	106 632 mh	24 11	2 571
Cr w CEFI			Mat 10		7 920 00 f	01	79
0050 Fini hi g ll bu l p rub with g ut							
0050 Fn h rub wth g t La dfill		7 200 00 f	Lab	01778 mh/ f	128 016 mh	24 11	3 086
C w CEFI			Mat 10		7 920 00 f	061	483
				Fi i hing w ll			6 220
					234 648 Labo hr		
132051 T k							
550 000 g l l t t La dfill		3 00	Sub		3 00	124 034 00	372 102
Qu t f om v d							
				Le chate Tank			981 613
					5 337 734 Labo hr		
					1 910 834 Equip hr		
Le k Det tion							
022208 B kfill tru t l							
4420 Ba kfill tru t l 200 H P 300 haul ommon ea th							
4420 Bk 200 hp 300 La dfill		48 90 cy	Lab	01633 mh/ y	799 mh	22 61	18
Cr w B10B			Eq	01088 mh/ y	532 mh	102 45	55
Fill f p ot ti o nd l k d t ti pip							
44 4 cy 1 10% h ink g 48 9 cy of mate i l to be							
ompa t d							
4420 Bk 200 hp 300 Landfill		24 40 cy	Lab	01633 mh/cy	398 mh	22 61	
C w B10B			Eq	01088 mh/ y	265 mh	102 45	27
Fill fo p ot ti n ound l k d t ti pipe							
22 2 cy 1 10% h ink g 24 4 y of mat i l to be							
compa t d							

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
				Ba kfill tru tu l			109
					1 197 Labo h		
					798 Equ p h		
022212 Bor							
0600 B b y&ld t pit h l 2 MI t&sp d W/200 HP do				l tru t F			
0600 Bbl2 t& /200 d f La dfill		48 90 y	Lab	04667 mh/ y	2 282 mh	25 193	57
C B15			Mat 10		53 79 y	9 87	531
S il f p t tiv fill o d l k d t ti n pip			Eq	04000 mh/ y	1 956 mh	67 37	132
0600 Bbl2 rt& w/200 d f La dfill		24 40 y	Lab	04667 mh/cy	1 139 mh	25 193	29
Cr w B15			Mat 10		26 84 y	9 87	265
S il f p t tiv fill o d l k d t tion pip			Eq	04000 mh/cy	976 mh	67 37	66
				Bo r w			1 080
					3 421 Labo hr		
					2 932 Equip hr		
022222 Compa ti							
0400 C mpa ti h p foot o obbly h l ll 8 lift l t fill							
0400 Cm ob hl 8 fl La dfill		48 90 cy	Lab	00800 mh/cy	391 mh	22 61	9
Cr w B10G			Eq	00533 mh/cy	261 mh	65 78	17
P t tiv il fo l k d t tio pip							
0400 Cm wob hl 8 fl Landfill		24 40 y	Lab	00800 mh/ y	195 mh	22 61	4
C w B10G			Eq	00533 mh/ y	13 mh	65 78	9
Prot tiv il fo l k d t tion pipe							
				Compa tion			39
					586 Labo hr		
					391 Equip h		
132191 T nk l k d t tn y tms							
0320 Tk lk d t t y p obe ary o t inment liq ph dbl wl pip &mh ump							
0320 Td ph pp& mp La dfill		1 00 e	Mat 0		1 00	640 00	640
0320 Td c ph pp& mp Landfill		1 00 e	Mat 0		1 00	640 00	640
				T nk l k d t tn y			1 280
151551 Pip pl ti							
0800 Pip PVC hi imp/p plg 10 OC hg 3 p 10				hed 40 12 di			
0800 Pp10 3 10 40 12 Landfill		300 00 lf	Lab	57143 mh/lf	171 429 mh	28 16	4 827
Crew Q2			Mat 0		300 00 lf	46 454	13 936
0800 Pp10 3 10 40 12 Landfill		150 00 lf	Lab	57143 mh/lf	85 715 mh	28 16	2 414
Cr w Q2			Mat 0		150 00 lf	46 454	6 968
				Pipe pl ti			28 145
					257 144 Labo hr		
				Leak Detection			30 653
					262 348 Labo hr		
					4 12 Equip h		
				OTHER STRUCTURES			6 624 150
					39 804 856 Labo hr		
					17 549 326 Equip hr		

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
.PROJECT MANAGEMENT							
P j t Suppo t C p							
001100 Engin i g (I teg t)							
03 A/E T h C lt	C p La dfill	471 00 h	Lab		471 00 hr	70 00	32 970
001300 P j t Ma g m nt							
01 PM Ttl II S pp C w 203	C p La dfill	228 00 h	Lab		228 00 hr	76 08	17 346
01 PM Prmtt g S p C 203	C p La dfill	743 00 h	Lab		743 00 h	76 08	56 527
01 TA Prmtt g S p C d008	C p La dfill	347 00 h	Lab		347 00 hr	81 95	28 437
01 CE Prmtt g S p C d145	C p La dfill	40 00 h	Lab		40 00 h	84 11	3 364
01 PM P rmnt S p C 203	Cap Landfill	27 00 h	Lab		27 00 hr	76 08	2 054
01 CE P rmnt S p C d145	C p La dfill	164 00 h	Lab		164 00 h	84 11	13 794
01 PM P t S p C 203	C p La dfill	632 00 h	Lab		632 00 hr	76 08	48 083
01 TA P t S p C w d008	C p La dfill	192 00 h	Lab		192 00 hr	81 95	15 734
01 CE P n t S p Cr d145	C p Landfill	68 00 h	Lab		68 00 hr	84 11	5 719
01 PM P d S pp C 203	C p La dfill	768 00 h	Lab		768 00 hr	76 08	58 429
01 CE P Mgm S p C d145	C p La dfill	2 061 00 h	Lab		2 061 00 hr	84 11	173 351
01 P j t Ma gmnt C 203	C p La dfill	4 755 00 h	Lab		4 755 00 hr	76 08	361 760
01 PM Ttl III S p Cr 203	C p Landfill	235 00 h	Lab		235 00 hr	76 08	17 879
01 CE Ttl III S p Cr w d145	Cap Landfill	51 00 hr	Lab		51 00 hr	84 11	4 290
01 TA Ttl III S p C w d008	C p La dfill	48 00 hr	Lab		48 00 hr	81 95	3 934
				P oj t Management	10 359 00 Labo hr		810 702
				Poject Suppo t Cap	10 830 00 Labo hr		843 672
Poject Suppo t C 11							
001100 Engi ing (I teg t)							
03 A/E T h Cn lt	C l Landfill	685 00 h	Lab		685 00 hr	70 00	47 950
001300 P j t Manag ment							
01 PM Ttl II S pp C w 203	C l La dfill	332 00 h	Lab		332 00 hr	76 08	25 259
01 PM Prmttng S p Cr w 203	C l La dfill	1 082 00 h	Lab		1 082 00 hr	76 08	82 319
01 TA Prmttng S p	C l Landfill	506 00 h	Lab		506 00 hr	81 95	41 467

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
C d008							
01 CE Prmttng S p	C l La dfill	58 00 hr	Lab		58 00 hr	84 11	4 878
Cr w d145							
01 PM P rmnt S p	C l La dfill	40 00 hr	Lab		40 00 hr	76 08	3 043
Cr w 203							
01 CE P rmnt S p	C l La dfill	240 00 hr	Lab		240 00 h	84 11	20 186
Cr d145							
01 PM P n t S p	C l La dfill	920 00 h	Lab		920 00 h	76 08	69 994
C 203							
01 TA P t S p	C l Landfill	280 00 hr	Lab		280 00 hr	81 95	22 946
Crew d008							
01 CE P n t S p	C l La dfill	100 00 h	Lab		100 00 hr	84 11	8 411
C w d145							
01 PM Pr d S pp	C l La dfill	1 118 00 hr	Lab		1 118 00 hr	76 08	85 057
C w 203							
01 CE P Mgm S p	C l La dfill	3 000 00 hr	Lab		3 000 00 hr	84 11	252 330
Cr w d145							
01 Prj t Mangmnt	C ll Landfill	6 920 00 hr	Lab		6 920 00 hr	76 08	526 474
C ew 203							
01 PM Ttl III S p	C l La dfill	343 00 h	Lab		343 00 hr	76 08	26 095
Cr 203							
01 CE Ttl III S p	C l Landfill	75 00 hr	Lab		75 00 hr	84 11	6 308
Cr w d145							
01 TA Ttl III S p	C l La dfill	71 00 hr	Lab		71 00 hr	81 95	5 818
Cr w d008							
				P oj t Management			1 180 586
					15 085 00 Labo hr		
				Poj t Support C ll			1 228 536
					15 770 00 Labo hr		
				PROJECT MANAGEMENT			2 072 208
					26 600 00 Labo hr		

ESTIMATE TOTALS

6 689 221	Labo		107 867 26	h	
3 897 469	Mat i l				
522 102	S bc t t				
1 331 496	Equipm t		17 950 853	h	
12 440 288					
1 757 736	FP C t to Di t C t			C	100 00000%
943 950	A/E Co t t Di t Co t			C	100 00000%
32 970	A/E C t t Di e t Co t			C	100 00000%
2 579 571	I teg t d C t Di t Co t			C	100 00000%
1 797 556	I t g t d C nt Di t Co t			C	100 00000%
7 111 783					
5 328 505					
150 955	B ildi g F to #1			C	16 10000%
	B ildi g F to #2			C	70 50000%
379 037	Mi Labo & Mat i l (FP)			C	10 00000%
255 767	FP S bco t t Ma kup			C	10 00000%
785 759					
6 114 264					
1 546 909	Fi d P i C t to OH&P			T	25 30000%
1 546 909					
7 661 173					
179 271	E l ti #6 o t t			T	2 34000%
179 271					
7 840 444					
235 213	P ocrmnt R cvr y(Con t di t)			T	3 00000%
235 213					
8 075 657					
1 757 736	FP C nt acto Di t Cost			C	100 00000%
1 757 736					
9 833 393					
20 562	Building F t #3			C	16 10000%
190 246	Buildi g F t #4			C	70 50000%
134 319	Mi Labo & Mat i l (DB)			C	10 00000%
48 407	FP S bcont a to Markup			C	10 00000%
393 534					
10 226 927					
544 271	Fi ed P i Cont a to OH&P			L	
544 271					
10 771 198					
671 998	Es al tion #6 (on di ects)			L	

ESTIMATE TOTALS

671 998

11 443 196

101 026 P o rmnt R ov y(C n t Addon) L

101 026

11 544 222

943 950 A/E C t to Di t C t C 100 00000%
2 737 E l ti n #1 (di t) C 29000%

946 687

12 490 909

28 388 P ocu mnt R ov y(A/E di t) L

28 388

12 519 297

32 970 A/E C t t Di ct C ts C 100 00000%
6 795 E l ti n #2 (on ddons) C 20 61000%

39 765

12 559 062

1 192 P c rmnt R v y (A/E ddo s) L

1 192

12 560 254

4 772 897 96 Sit Suppo t T 38 00000%

4 772 897

17 333 151

2 391 975 96 Sit G&A T 13 80000%

2 391 975

19 725 126

3 156 020 96 Company G&A T 16 00000%

3 156 020

22 881 146

2 579 571 Integ ted Cont Di t Cost C 100 00000%

2 579 571

25 460 717

1 776 Es l tio #2 (on dir t) C 29000%
23 722 E lation #4 (on directs) C 1 75000%
11 795 Esc l tion #5 (on di ts) C 2 34000%
2 520 Es l tion #9 (on di t) C 2 34000%

39 813

140

ESTIMATE TOTALS

25 500 530						
	1 797 556	I t g t d C nt	Di	t Co t	C	100 00000%
	1 797 556					
27 298 086						
	67 775	E l ti #2 (	ddo)		C	20 61000%
	210 103	E l tio #4 (o	ddo)		C	22 57000%
	107 233	E l tion #5 (o	ddon)		C	24 93000%
	26 844	E l tion #9 (on	ddons)		C	24 93000%
	411 955					
27 710 041						
	10 089 960	Co ti g n y			T	36 41265%
37 800 001	TOTAL ESTIMATE					

CLASS	DESCRIPTION	LABOR HOURS	BASE COST	LABOR CLASSES ONLY V &F g	T av l	Co tC t	S p rv	OTHERS	TOTAL COST
APPR	App ti 80%	180 858						3 668	3 668
CARP	C p nt	1 150 188	16 965	5 371		5 992	1 024		29 353
CEFI	C m t Fi i h	2 226 478	34 956	6 924		11 244	2 093		55 217
CLAB	C mmo Labo	7 154 303	72 974	21 105		25 255	4 364		123 698
ELEC	El t i i								
EQHV	Eqp Op C / h vl	1 740 879	27 105	7 190		9 209	1 619		45 124
EQLT	Light Eqp Op t	2 700 29	40 693	11 152		13 934	2 430		68 209
EQMD	M di m Eqp Op t	8 193 802	126 348	33 840		43 017	7 620		210 827
EQOL	Equipm nt Oil	4 153 578	61 141	17 154		21 017	3 655		102 967
FORI	F ma I id	38 00	946	152		295	57		1 450
FORO	Fo ma Out id	1 460 831	33 351	5 843		10 518	2 001		51 713
PLUM	Pl mbe	445 715	8 683	2 532		3 013	521		14 749
RODM	Rodme (R i f i g)	734 604						19 908	19 908
SKWK	Skill d v 35T d	2 019 43	57 836						57 836
SSWK	Stru t St el W k	242 583	3 821	815		1 244	230		6 111
SSWL	W ld Stru t St l	1 714	27	6		9	2		43
STPI	St m/Pip fitt	76 00	1 464	485		523	88		2 560
TRHV	Tru k D iv H vy	4 561 291	75 763	19 568		25 589	4 561		125 481
TRLT	Tru k D iv Light	115 717	1 610	496		566	96		2 768
203	E vi nm t l R t	18 143 00	403 682					976 638	1 380 319
237	Wa t Op ti	1 486 00	34 847					82 458	117 305
308	Fi P t ti	27 00	519					1 741	2 260
321	Eme g y P p dn	914 00	20 684					64 921	85 605
379	Radiologi l Ope t	283 00	6 475					18 463	24 938
421	Radi l H lth & E g	195 00	4 770					13 252	18 022
441	Constru ti Ma gmt	5 236 00	148 179					390 501	538 680
448	Fa ility I pe ti	2 260 00	52 409					162 946	215 355
483	De nt minat & Demo	10 950 00	288 752					652 401	941 153
b392	ESH&Q Ov ight	1 355 00	38 496					84 457	122 953
d008	T chni l As n	1 444 00	35 667					82 669	118 336
d048	ES&H S ppo t Sy t ms	256 00	6 543					17 884	24 428
d145	Te hni l & Admi	9 366 00	239 770					548 005	787 774
	GRAND TOTALS	89 111 260	1 844 474	132 635		171 425	30 362	3 119 912	5 298 808

DESCRIPTION	TOTAL
TITLE I	1 008 794
TITLE II	1 818 739
TITLE III	1 558 565
CONST INSPECTION	675 539
BUILDINGS (NEW)	566 288
CONSTRUCTION MGMT	4 095 236
IMPROVEMENTS TO LAND	176 760
OTHER STRUCTURES	10 801 174
PROJECT MANAGEMENT	7 008 947

ITEM DESCRIPTION	LOCATION	TAKEOFF QTY	W%	CONVERSION	ORDER QTY	UNIT PRICE	AMOUNT
Op tions							
010001 Gen l R qui me t W t Cell Op t C 6 237 Ope tions f g iddi g d pti g t Assume w t ll p ti will qui 6 me fo two yea {6 me (2 y 2080 h /y) 24 960 hou }		1 00 1	Lab	24960 00000 mh/1	24 960 00 mh	78 94	1 970 342
					Operations 24 960 00 Labo hr		1 970 342
Po t Cl ur Act							
010001 G l R qui ment P t l Spt f 30 Y Crew 237 421 Po t Cl d mo it ing of th ll fo 30 y As e 240 h /yr f th fi t 10 y nd 120 h /yr f th l t 20 yr fo tot l of 4 800 fo ll 30 yr		1 00 1	Lab	4800 00000 mh/1	4 800 00 mh	85 68	411 264
					Po t Closur Act 4 800 00 Labo hr		411 264

ESTIMATE TOTALS

	2 381 606	Labo	29 760 00	h	
2 381 606					
	411 264	I t g t d C t Di t Co t		C	100 00000%
	411 264				
1 970 342					
	256 736	E l tio #1 (n di t)		C	13 03000%
	256 736				
2 227 078					
	411 264	I t g t d C nt Di t Co t		C	100 00000%
	263 908	E l tio #2 (on di t)		C	64 17000%
	675 172				
2 902 250					
	1 102 855	96 Sit S ppo t		T	38 00000%
	1 102 855				
4 005 105					
	552 704	96 Sit G&A		T	13 80000%
	552 704				
4 557 809					
	729 249	96 Comp y G&A		T	16 00000%
	729 249				
5 287 058					
	912 942	Co ti g cy #2		C	38 33303%
6 200 000	TOTAL ESTIMATE				

R ky Fl t

E timati g E t An ly i S mmary
989820 2O

9 27 95 P g 1
7 51 am

CLASS	DESCRIPTION	LABOR HOURS	BASE COST	LABOR CLASSES ONLY V &F g	T v l	C tC t	S p rv	OTHERS	TOTAL COST
237	W t Op tion	27 360 00	641 592					1 518 206	2 159 798
421	Radi l H lth & E g	2 400 00	58 704					163 104	221 808
	GRAND TOTALS	29 760 000	700 296					1 681 310	2 381 606

PROJECT NAME Ope tion and Po t Closur Act W t C 11
ESTIMATE NO 989820 2O
AUTHORIZATION NO 989820

D iption 989820 2O

Client COWDRY/ERICSON/LINDSAY

E timat Bry n L Lewi

Rat tabl 96/FP DIR

Co t E timat App ov l

App l by th P oj t Engi ignifi ur f th op
p t d i th co t timat nd th pp op i t d ign o t

_____Proj t Engin r

App ov l by P j t Man g ignifi oncu n with p j t s ope and
o t p nt d in th o t timat

_____Proj t Manag

Report format DOE/Phas o d
Detail eport
Print w
Print memo
Print extended d iptions

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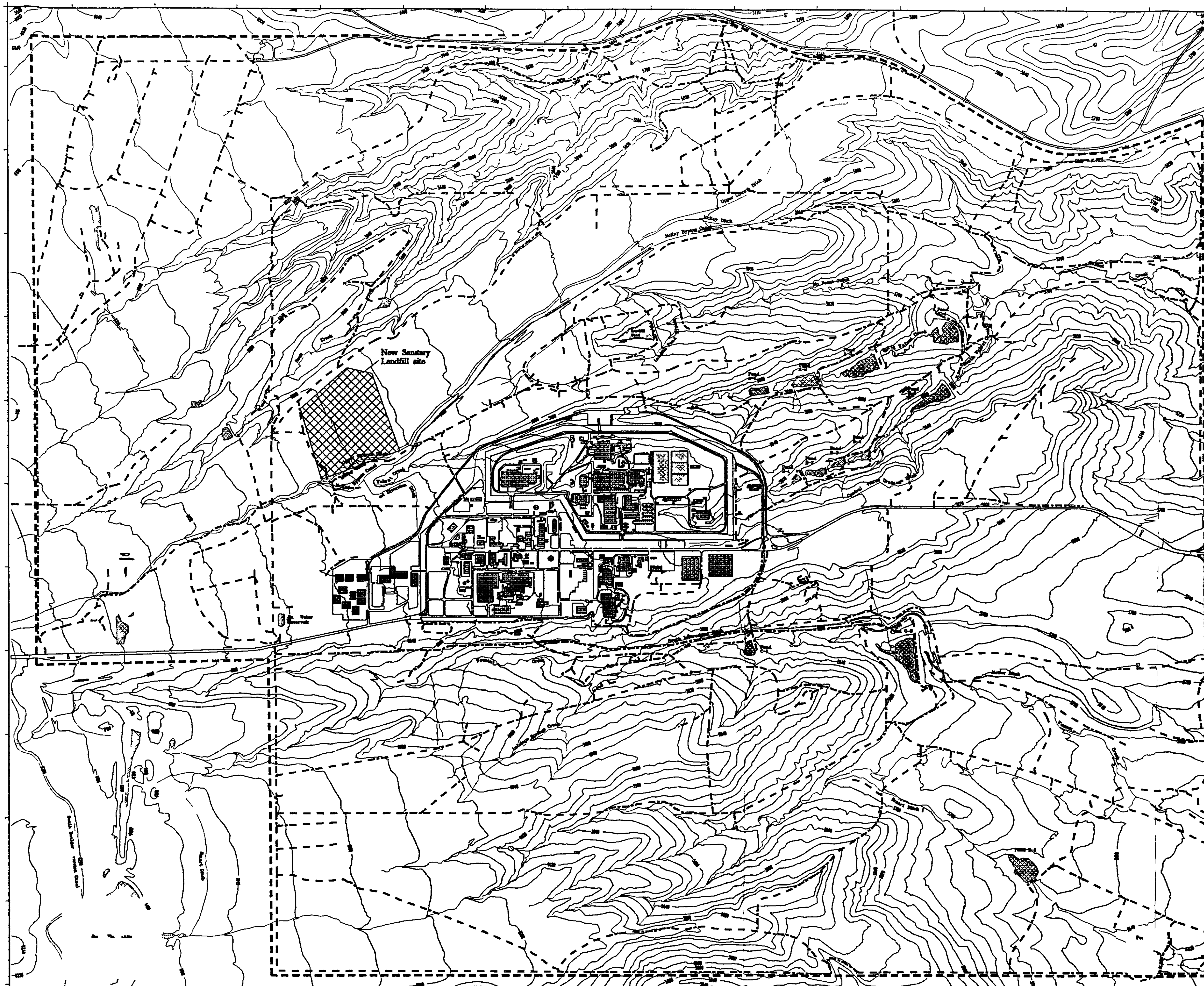

Figure 1

Standard Map Features

- Buildings or other structures
- Lakes and ponds
- Streams ditches or other drainage features
- Fences
- Contours (20 Intervals)
- Rocky Flats boundary
- Paved roads
- Dirt roads

DATA SOURCE.
Buildings, roads, and fences provided by Facilities Engr., EG&G Rocky Flats, Inc. 1991
Hydrology provided by USGS (date unknown)

Sc le = 1 19640
1 inch represent pp oximat ly 1636 66 feet

0 0 10 200 ft

Stat Plane Coordinat Projection
Colorado Cent al Zone
Datum NAD27

U S Department of Energy
Rocky Flats Environmental Technology Site

Prepared by

RMRS Rocky Mountain Remediation Services, L.L.C.
Geographic Information Systems Group
Rocky Flats Environmental Technology Site
P. Box 464
Golden, CO 80402-0464

MAP ID: ***Draft***

September 06, 1995

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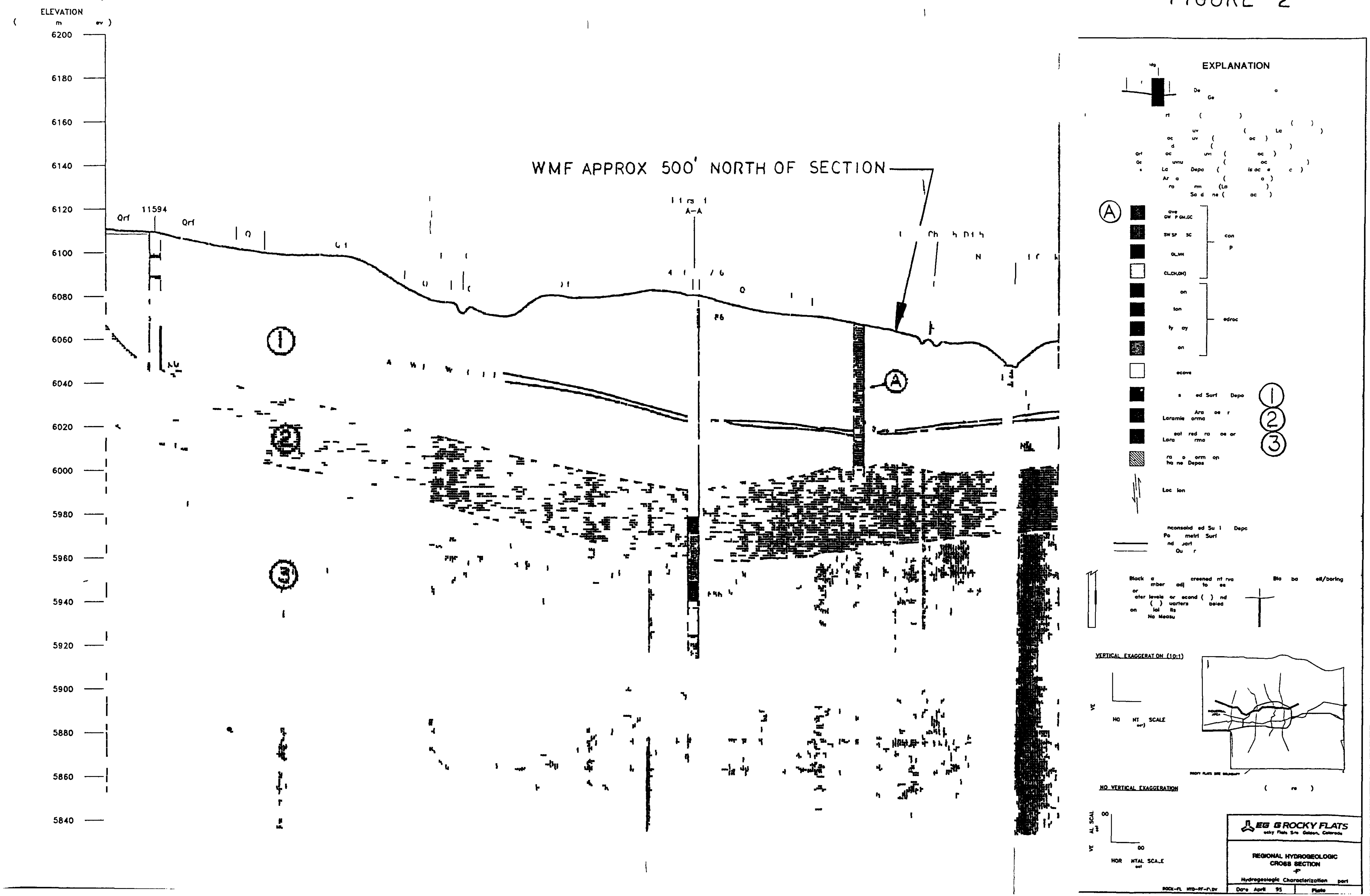
FIGURE 2


WEST
F
ELEVATION
6200
6180
6160
6140
6120
6100
6080
6060
6040
6020
6000
5980
5960
5940
5920
5900
5880
5860
5840
11594
Qrf
A–A
WMF APPROX 500' NORTH OF SECTION
A
1
2
3
EXPLANATION
Laramie
VERTICAL EXAGGERATION (10:1)
NO VERTICAL EXAGGERATION
EG&G ROCKY FLATS
REGIONAL HYDROGEOLOGIC CROSS SECTION
Hydrogeologic Characterization
April 95

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SOUTH

NORTH

A

ELEVATION
(m)

6200
6180
6160
6140
6120
6100
6080
6060
6040
6020
6000
5980
5960
5940
5920
5900
5880
5860
5840

M KAY DITCH

UPPER CHURCH DITCH

WMF APPROX 1500' EAST OF SECTION

4786 4686

0390

Qrf

Qc

1

2

3

150

FIGURE 3

EXPLANATION

VERTICAL EXAGGERATION (10:1)

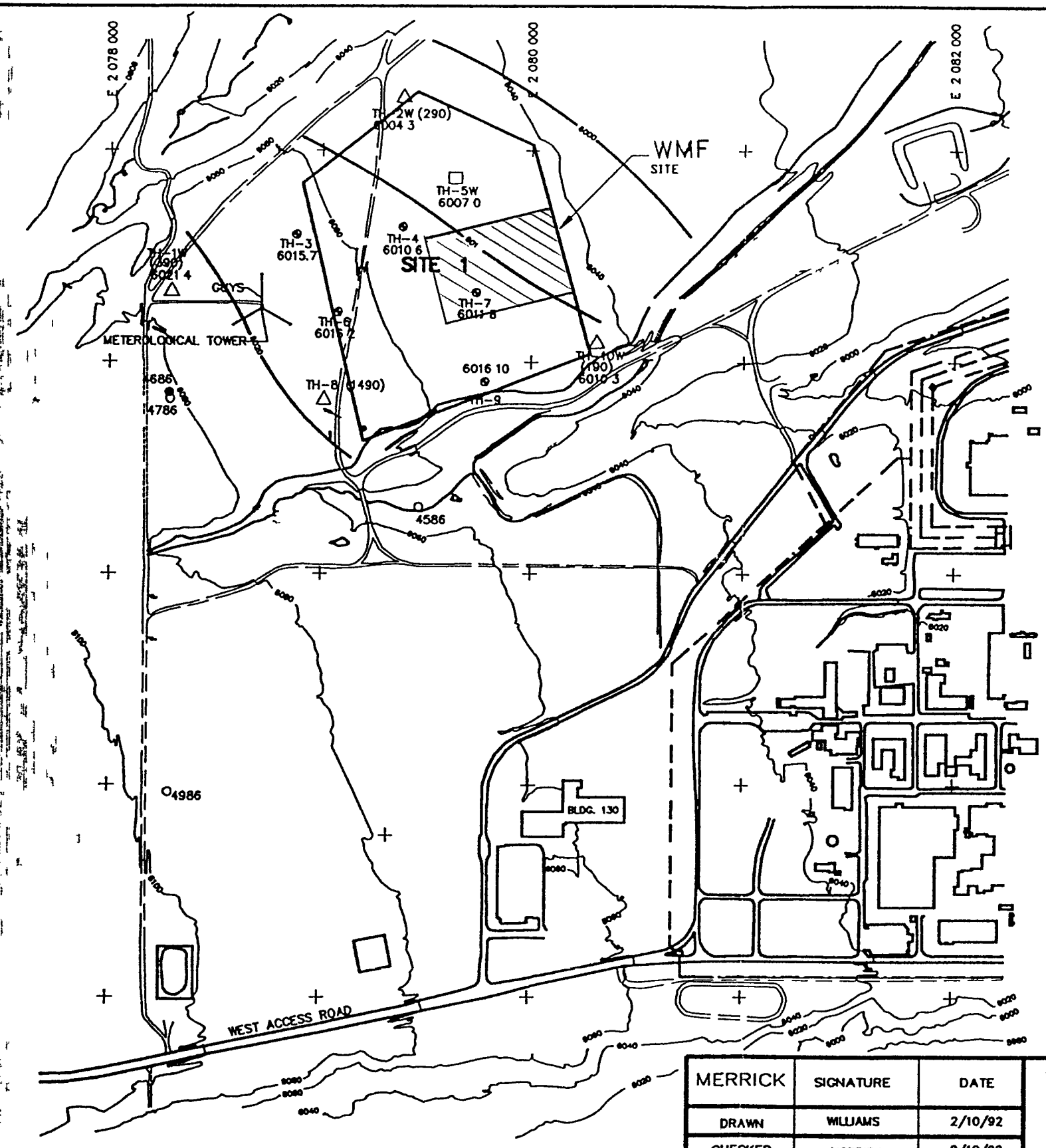
NO VERTICAL EXAGGERATION

EG & ROCKY FLATS

REGIONAL HYDROGEOLOGIC CROSS SECTION

Hydrogeolog

Date Apr 99



LEGEND:

- TEST HOLE LOCATION DRILLED FOR FIELD INVESTIGATION
- WELL LOCATION DRILLED FOR FIELD INVESTIGATION
- STUDY AREA BOUNDARY
- BEDROCK MONITOR WELL PREVIOUSLY INSTALLED
- ALLUVIAL MONITOR WELL PREVIOUSLY INSTALLED
- PIEZOMETER LOCATION INSTALLED FOR FIELD INVESTIGATION
- 6010 GROUNDWATER SURFACE CONTOUR DASHED WHERE INSUFFICIENT DATA AVAILABLE

REVIEWED FOR CLASSIFICATION/UCNI
By [signature] (UNC)
Date

MERRICK	SIGNATURE	DATE
DRAWN	WILLIAMS	2/10/92
CHECKED	MCBRIEN	2/10/92
APPROVED	SPRENKLE	2/10/92

CADD FILE NAME
FIG 4-7

WOODWARD-CLYDE CONSULTANTS
DENVER COLORADO

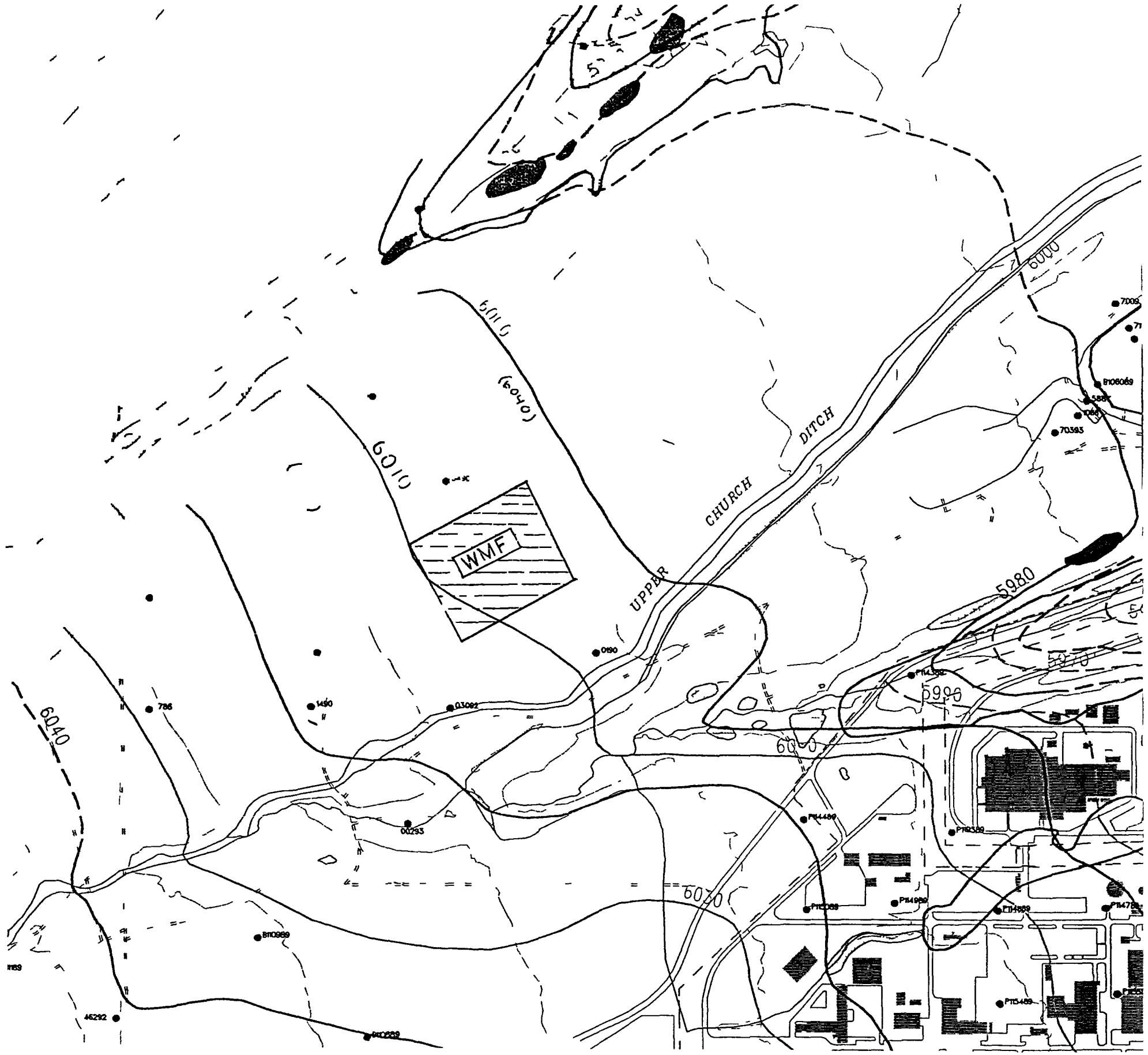
MERRICK
DENVER COLORADO

TITLE ROCKY FLATS PLANT - NEW SANITARY LANDFILL SITE GROUNDWATER ELEVATIONS WITH LOCATIONS OF FIELD INVESTIGATION TEST HOLES MONITORING WELLS & SURFACE WATER MONITORING

DRAWING NO
FIGURE 4

REVISION
A

FIGURE 5



EXPLANATION

- Wt L IC t
- (dashed wh ferr d)
- I t rmed t W t L I Co t
- (d hed wh f rr d)
- T pog aph C nt (XXXX)
- Appr m t Ext t f Rocky Fl t Alluv m
- St ms and D a g
- P d Road
- D rt Roads
- R cky Fl ts Pl t St and Secu ty Zo B ndari s
- Rocky Flat Site Boundary
- S rf e Wate Impoundm ts
- Build g

N

Scale = 1 6000
1 inch = 500 feet

Sta e Plane Coordinate Syste n
Colorado Central Zone
Datum NAD27

EG&G ROCKY FLATS
Rocky Flats Site, Golden, Colorado

Potentiometric Surface of Unconsolidated Surficial Deposits Fourth Quarter 1993

Hydrogeologic Characterization R port

April 1995 | Plate 3

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FIGURE 6

EXPLANATION

- Li f Eq l Depth t Wat C t
- (d hed wh f rr d)
- D r g Li e f Eq al D pth t W t Co t
- (dashed wh f rr d)
- T pog aph Co t rs (XXX)
- Appro m te Ext t f Rocky Flats Alluv m
- Streams and D ai ag
- Pa ed Road
- D rt Road
- Rocky Flats Plant Site and S cu ty Zo Bo ndari
- Rocky Flats Site Bo dary
- Surface Water Impo ndments
- Buildi g

Scale = 1 6000
1 inch = 500 feet

State Plane Coordinate System
Colorado Central Zone
Datum NAD27

EG&G ROCKY FLATS
Rocky Flats Site, Golden, Colorado

Average Depth to Water
in
Unconsolidated
Surficial Deposits

Hydrogeologic Characterizat on Report

April 1995 | Plate 7

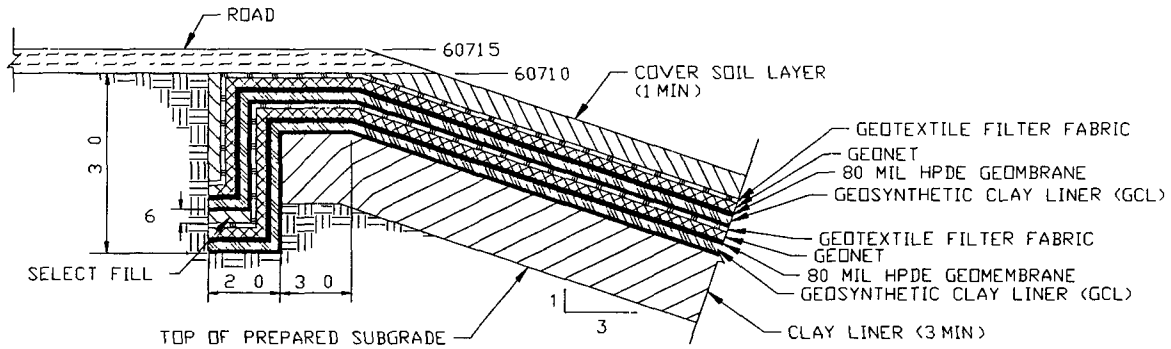
CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

KEYWORDS	A	ORIGINAL ISSUE			9 26 95			98
1 WASTE	SU	C ON			TE	FP	DOE CLASS	JO
2 CELL		DE GN	G.KASEL	9/21/95	U S DEPARTMENT OF ENERGY			
3 SITE		DR WN		9/21/95	ROCKY FLA OFFICE GOLDEN, COLORADO			
4 PLAN		E		9/22/95	Rock ts Plan			
5	UNLESS N TED OTHERWISE	P VE		7/6/95	GOL N OLORADO			
SITE	REMOVE BU AN SHARP CE				WASTE MANAGEMENT FACILITY			
					SITE PLAN			
	SC LE 1 100	SU TED / APP RFP / APP DOE			D 51376-C001			A

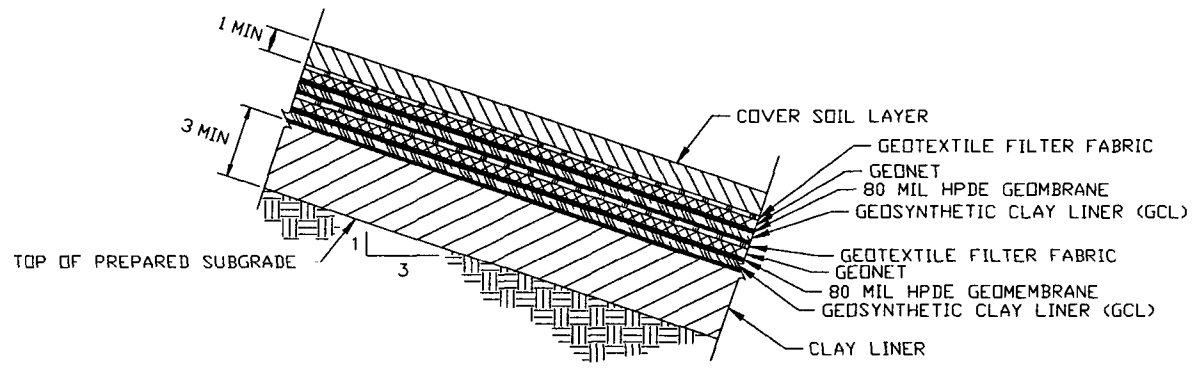
AUTOCAD REL 12 GENERATED

ACAD ARCHIVE 76/C001 DWG ACD 76.C001

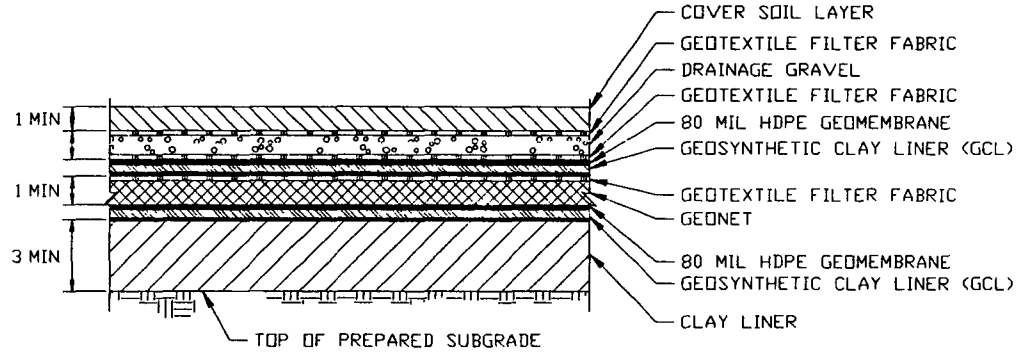
154



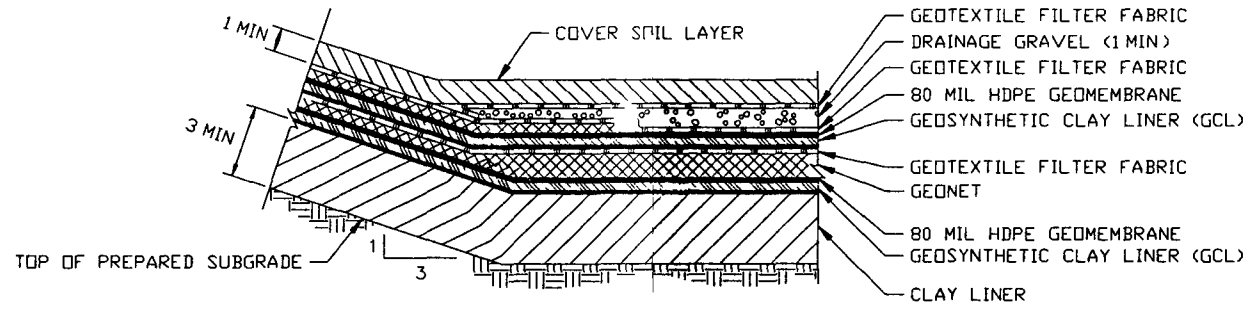
E DETAIL – CELL ANCHOR TRENCH
NOT TO SCALE



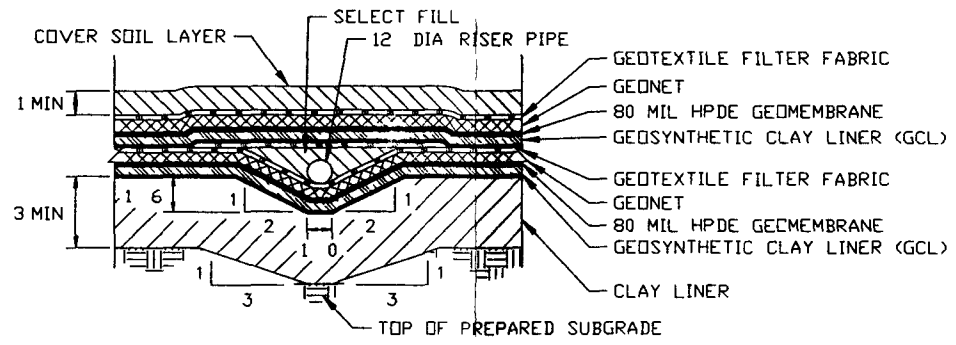
B DETAIL – CELL SIDE
NOT TO SCALE



A DETAIL – CELL BOTTOM
NOT TO SCALE



D DETAIL – CELL TOE OF SLOPE
NOT TO SCALE



C DETAIL – CELL SIDE SLOPE RISER LEAK DETECTION TRENCH
NOT TO SCALE

CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

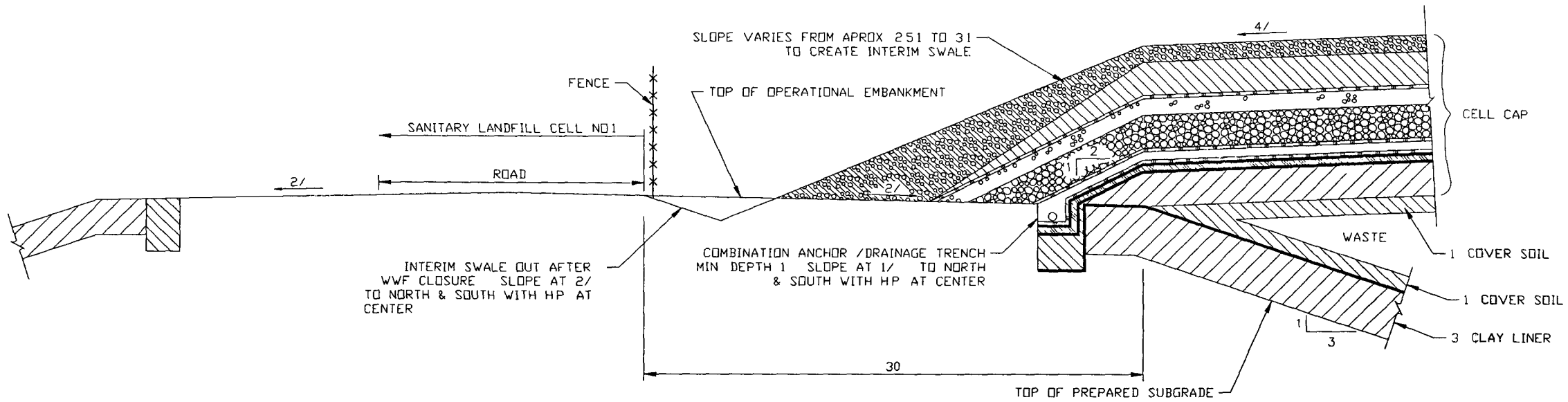
KEYWORDS	A	ORIGINAL ISSUE				9 26 95			KG 17-93	9	38
1 WASTE	S		E	ON		TE	FP		OE	CLASS	JOB
2 CELL					TE	U S DEPARTMENT OF ENERGY					
3 LINES			DE GNED	KASEL	9/1/95	ROCKY FLA OFFICE GOLDEN, COLORADO					
4			WN	J.MAGENGAS	9/1/95	ock Fla Plant					
5			E		9/2/95	GOLDE OLORADO					
SITE			AP	VE	9/4/95	WASTE MANAGMENT FACILITY					
						CELL UNDER DETAILS					
			SUBM TED			ZE	D	WI	R	ISSUE	E
		NTS	APP FP			D	51376-C002			A	
			APP DOE								

AUTOCAD REL 12 GENERATED

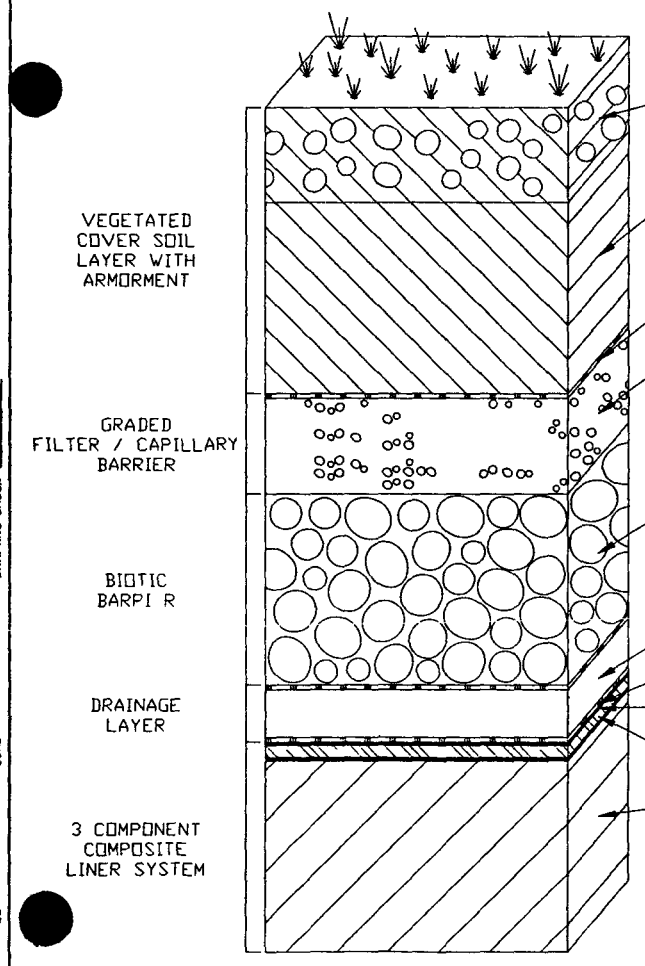
ZE OR REV N VEMBER 9

D RCHIVE CD /C00 WG C002

155



F DETAIL – (TYPICAL)
NOT TO SCALE
SECTION AT WEST BERMS



SECTION VIEW

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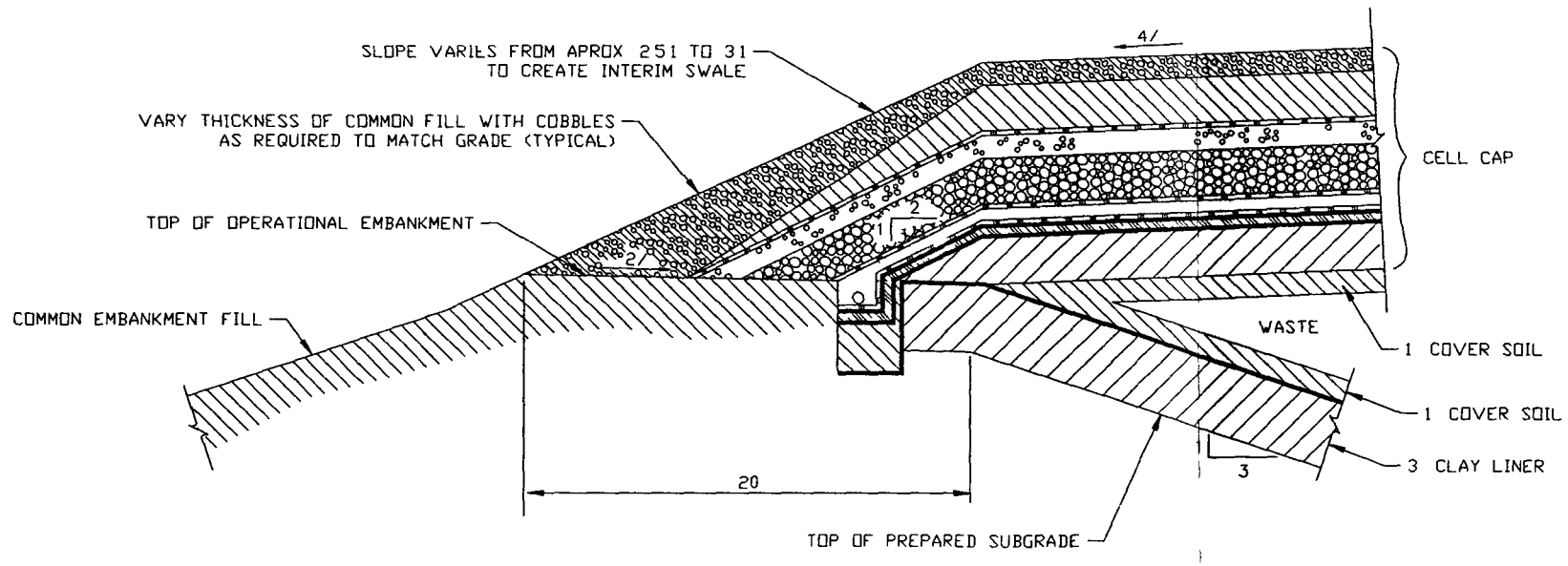
F DETAIL – CELL CAP
SCALE NOT TO SCALE



F DETAIL – (TYPICAL)
NOT TO SCALE
SECTION AT NORTH AND SOUTH BERMS

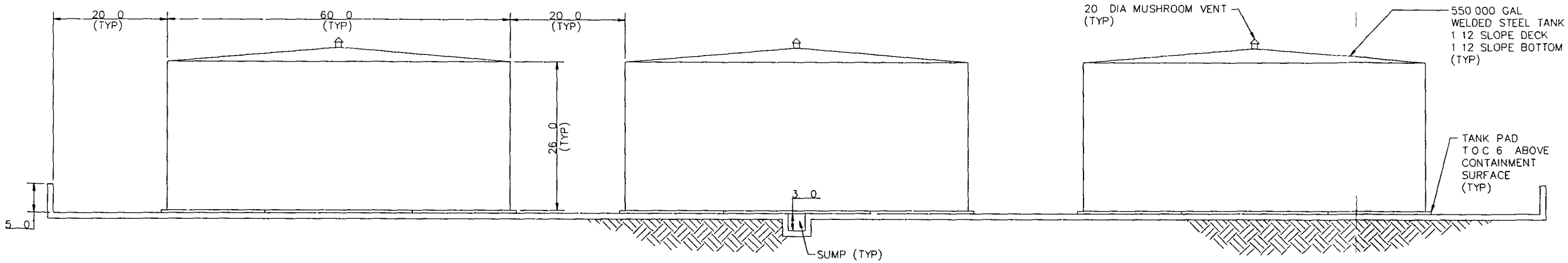
CONCEPTUAL DESIGN
OT OR CO STRUCTIO

KEYWORDS	A	ORIGINAL ISSUE			9 2 95	9 9 38
1 WASTE	SU		ON		TE	RFP	L	JOB
2 CELL	TOLE FR	SI		TE		U S DEPARTMENT OF ENERGY
3 COVER	ANGLE		DE GNED	ASEL	9/21/95	ROCKY FLA OFFICE GOLDEN COLORADO
4	DE UN ESS OTH ERW ISE SPE CIFI ED		WIN	MAGENDAS	9/ /95	Rocky lats Plant
5	REM VE BUR AND HA RE				9/ 2/95	GOLDE OLORADO
BUILDING ACILI SITE	NEXT SSEMBL		APPROVE		9/ 6/95	WASTE MANAGMENT FACILITY
OGM AREA						CLOSURE PLAN DETAILS
CRS COORD COL WG			SUB I TE			E D WI B ISSUE E
E NTS			PP P			D 51376-C003 A
			APP DOE			

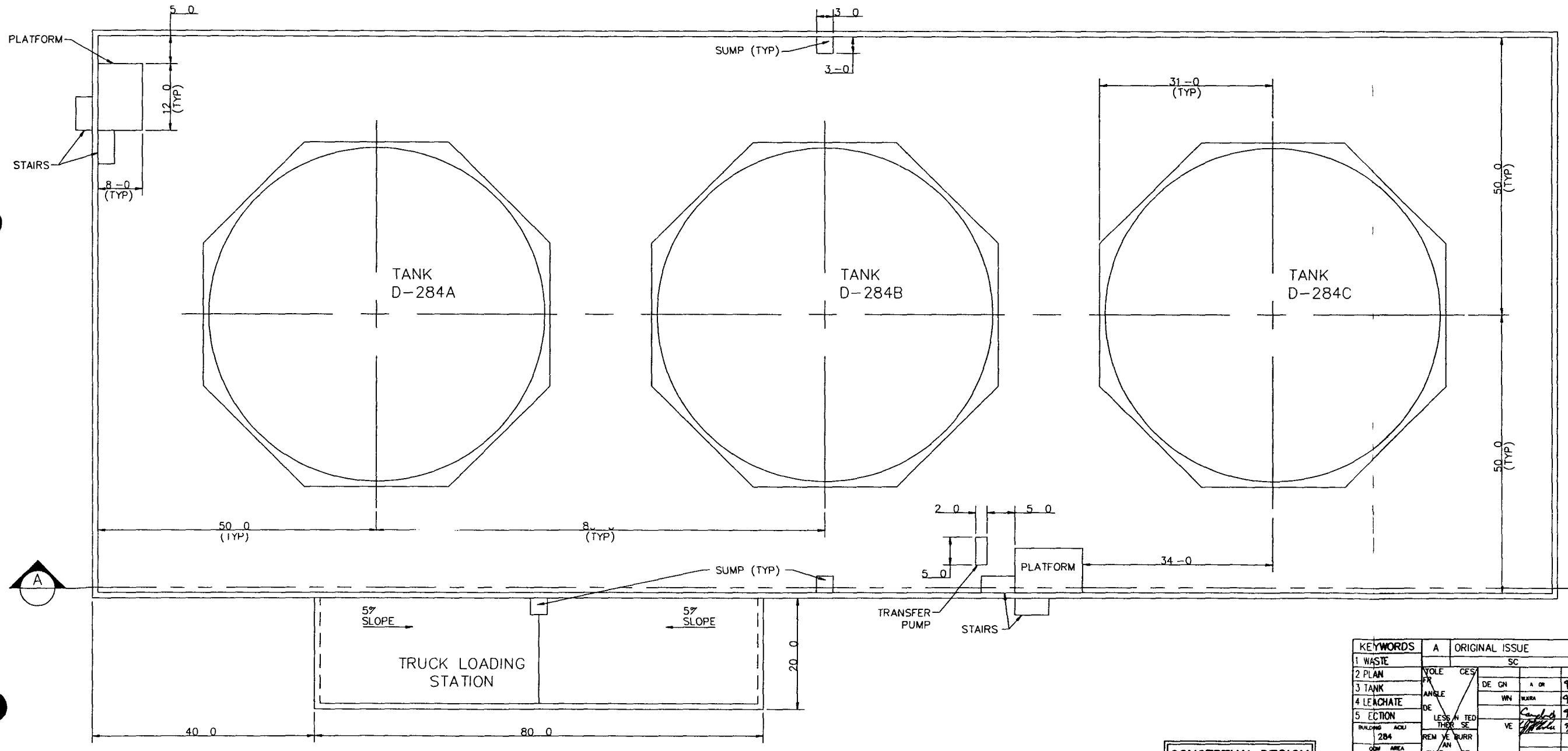
DSIZE ORM REV MOVE BE

AUTOCAD REL 12 GENERATED
NO MANU CHANGE ALLOWED

ACAD AR HIVE /C003A WG C00 WG



A SECTION–LEACHATE STORAGE TANKS
SCALE 1 10



PLAN–LEACHATE STORAGE TANKS
SCALE 1 10

CONCEPTUAL DESIGN
NOT FOR CONSTRUCTION

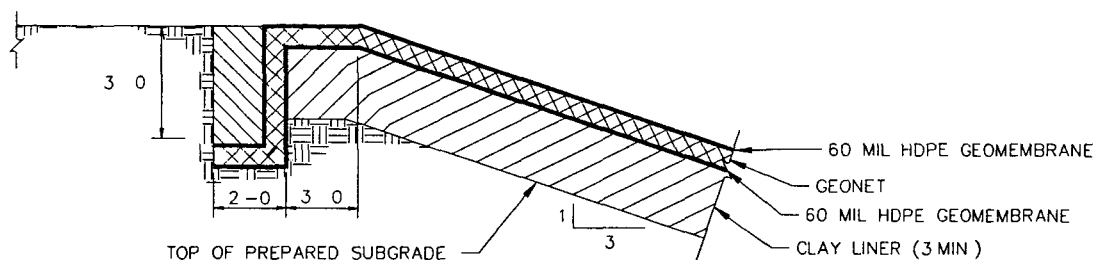
157

KEYWORDS	A	ORIGINAL ISSUE				9 26 95	8 38
1 WASTE			SC			TE	OE CLASS JOB
2 PLAN	YOLE CES FR				TE	U S DEPARTMENT OF ENERGY	
3 TANK	ANGLE	DE GN	A OR	9/21/95	ROCKY FLA OFFICE GOLDEN COLORADO		
4 LEACHATE	DE	WN YUARA		9/ /95	ocky Flats Plan		
5 ECTION	LESS N TED THER SE			9/22/95	GOLDEN OLORADO		
BUILDING ACIU 284	REM VE BURR AN SHAR RE	VE		9/ /95	WASTE MANAGMENT FACILITY		
ODM AREA	NEX SSEMBL				LEACHATE TANKS PLAN GENERAL ARRANGEMENT		
GR COORD COL NO		M TTED			E DR WN NU BE	ISSUE	SH
	LE 1 10	PP RFP			D 51376-C004	A	OF
		PP DOE					

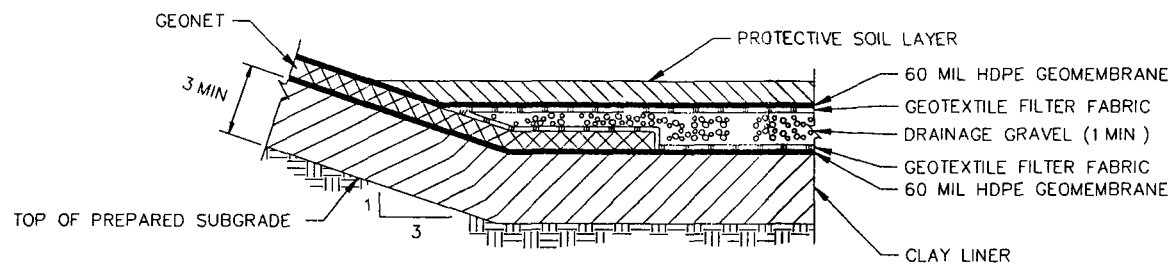
DSI E ORM REV NOVEMBE 99

AUTOCAD REL 12 GENERATED NO ANU CHANGES (/NEW)

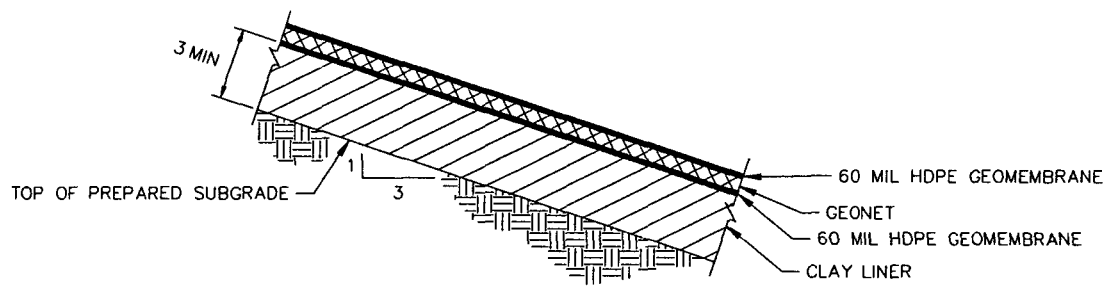
ACAD /C004A.DWG
ARCHIVE ACD 78.C004.A



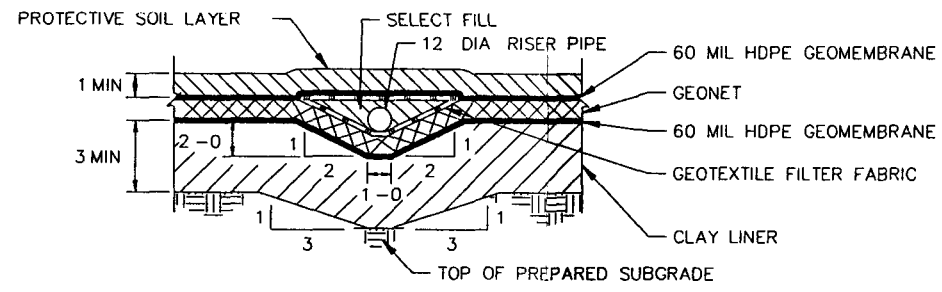
(E) DETAIL – POND ANCHOR TRENCH
NOT TO SCALE



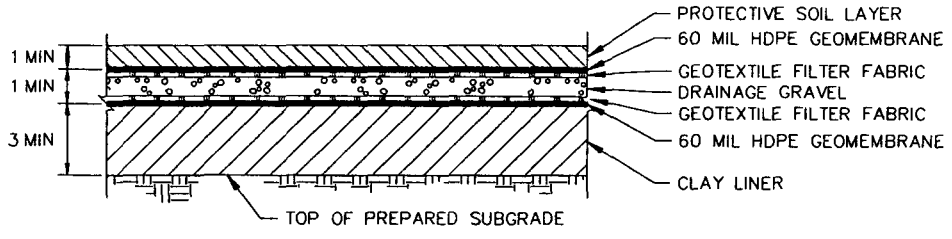
(D) DETAIL – POND TOE OF SLOPE
NOT TO SCALE



(B) DETAIL – POND SIDE
NOT TO SCALE



(C) DETAIL – POND SIDE SLOPE LEAK DETECTION RISER TRENCH
NOT TO SCALE



(A) DETAIL – POND BOTTOM
NOT TO SCALE

158

CONCEPTUAL DESIGN
NOT FO CO STRUCTO

KEYWORDS	A	ORIGINAL ISSUE	9 26 95		KP 9/26 95	989 38
1 WASTE		SC N	TE		OE CLASS	JO
2 POND			DE GNED	SEL	9/21/95	
3 INER			WN	MACENGAS	9/ /95	
4			H K		9/ 2/95	
5			AP R VE		9/26/	

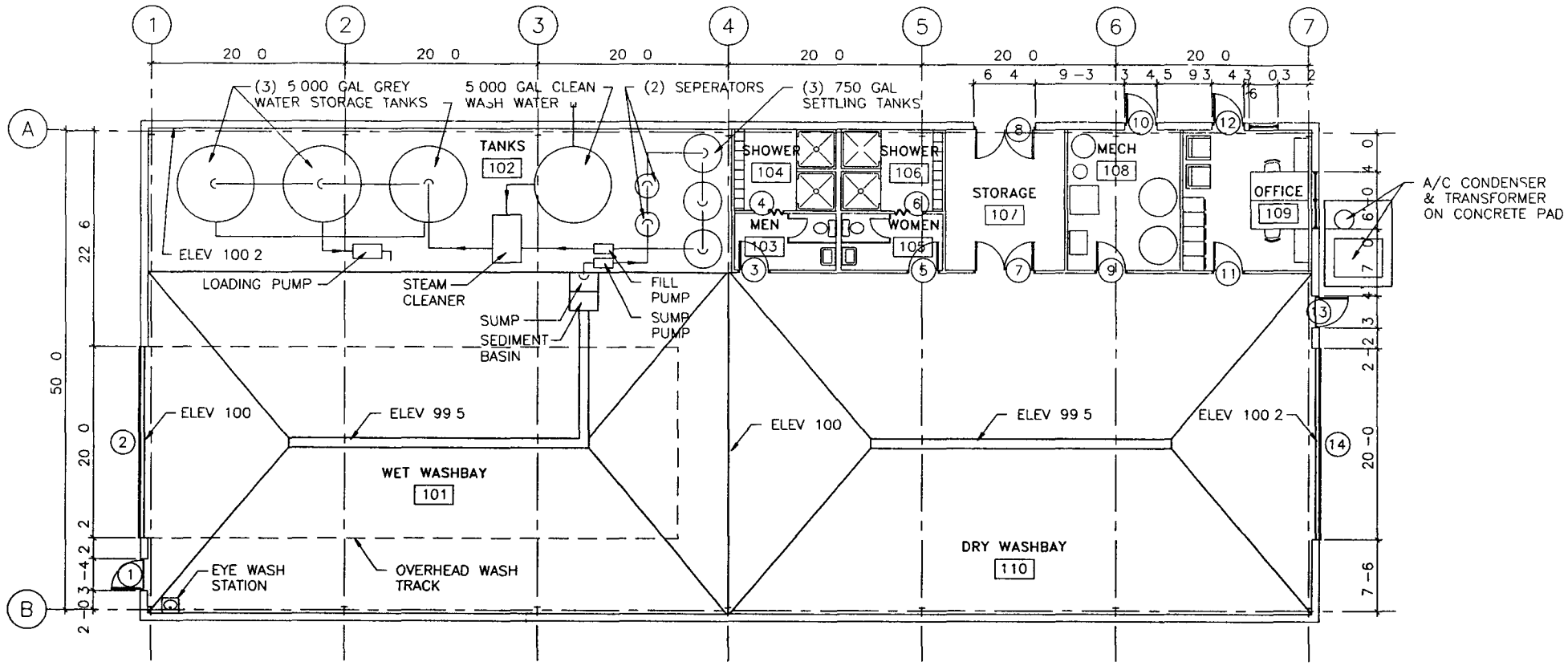
US DEPARTMENT OF ENERGY
ROCKY FLA OFFICE GOLDEN, COLORADO
ock I Plan
OLDE COLORADO
WASTE MAMAGMENT FACILITY
EVAPORATION POND LINER DETAILS

ZE	D WI	E	ISSUE
D	51376-C005	A	F

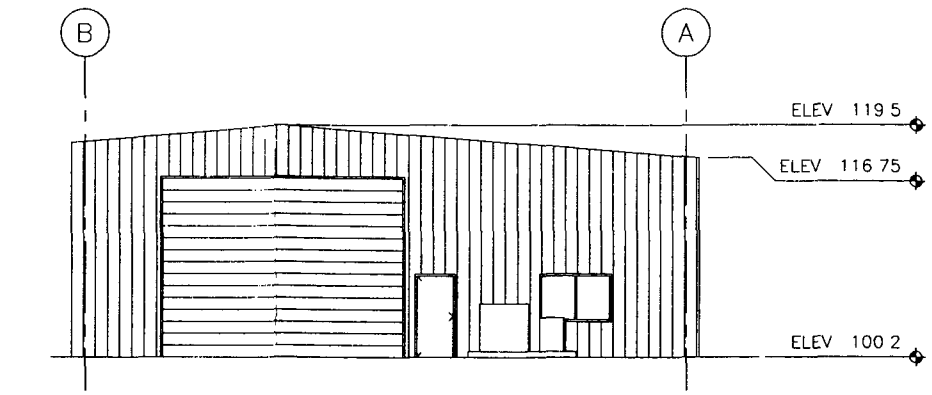
SC L NTS
AP RFP
APP DOE

AUTOCAD REL 12 GENERATED
NO MANUAL CHANGE ALLOWED

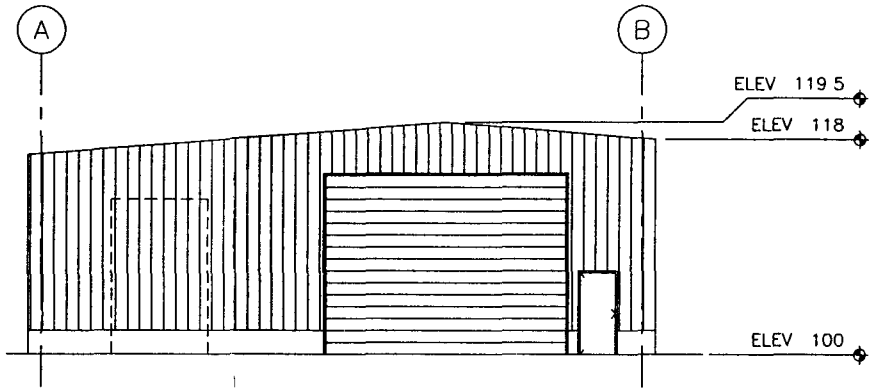
D / 00 WC
VE C005



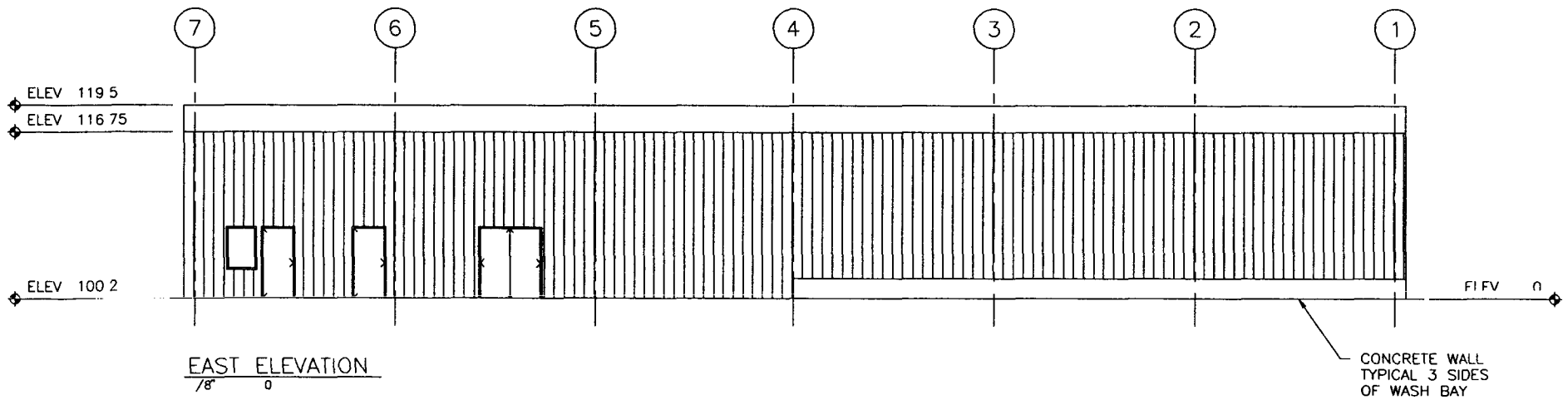
FLOOR PLAN
/8 0"



SOUTH ELEVATION
/8" 0"



NORTH ELEVATION
/8 0"



EAST ELEVATION
/8" 0

NOTES
1 ELEV 100 0 6072 5

CONCEPTUAL DESIGN
NOT FOR CO STRUCTIO

KEYWORDS	A	ORIGINAL ISSUE		9 26 5		KB 7-9-95	8 38
1 WASTE	SU	E CR ON		D E		OE QA SS	JOB
2 BUILDING	VOLER FRAC		TE	U S DEPARTMENT OF ENERGY			
3 PLAN	ANGLE		D.EVANS 9/21/95	ROCKY FLA OFFICE GOLDEN, COLORADO			
4 ELEVATION	DE		WN S.DRUMER 9/21/95	ock a Plant			
5	UNLESS N TE THERWISE		APP VED 9/22/95	GOLDEN OLORADO			
BUI DING ACIU 283	REM VE R S		1/24/95	WASTE MANAGMENT FACILITY			
ROOM AREA	SHARP DGE			BUILDING 283 FLOOR PLANS & EXTERIOR ELEVATIONS			
GRI COORD COL NO.	FX SSEMBL		SU M TE				
	C E 1/8 1 0		APP FP AP DOE	WI	E	ISSUE	
				D 51376-C006		A	OF

AUTOCAD REL 12 GENERATED
NO MANUAL CHANGES ALLOWED

DSIZE ORM
RE NOVEMBER

AD 5/C006 WG
ARCH VE CD 6 C006

159/159